Lake Mary Road
CA PFH 81-1(1)

Final Hydraulics Reconnaissance Report

Mammoth Lakes, California
Mono County
Inyo National Forest

Prepared for:

U.S. Department of Transportation
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Central Federal Lands Highway Division
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30% Design Package
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I. INTRODUCTION

On Tuesday, August 19, 2003, a review meeting was held at the Town of Mammoth Lakes offices in Mammoth Lakes, California for the above referenced project. The following day, Mr. Jeff Wilson of Carter & Burgess conducted a reconnaissance inspection of existing culverts in the project area to gather hydrologic and hydraulic data. The purpose of the site investigation was to determine existing drainage conditions within the project area and to make preliminary recommendations for improvements. Other factors assessed on the site visit included potential floodplain impacts and encroachments, potential water rights and resource impacts, and determination of erosion control and water quality needs. A photo log of this inspection is included in the Appendix of this report.

The data and photos collected during the inspection were subsequently reviewed and interpreted by Mr. Mike Butters of Carter & Burgess. An evaluation was also made of other drainage related studies performed in the Lake Mary Road region. The purpose of this report is to document the findings of the reconnaissance inspection, and to determine appropriate design criteria, pipe materials, and hydrology computation methodology to be used for the project.

II. PROJECT DESCRIPTION AND LOCATION

The Central Federal Lands Highway Division (CFLHD) of the Federal Highway Administration (FHWA), in cooperation with the Inyo National Forest (INF) and the Town of Mammoth Lakes, is proposing to improve the pavement and drainage conditions for Lake Mary Road. The project consists of the rehabilitation, restoration, and resurfacing (3R) of approximately 2.8 miles of the road between the Horseshoe Lake parking area and the Lower Twin Lakes Loop Road.

Lake Mary Road is located in the Inyo National Forest, just southwest of the Town of Mammoth Lakes in Mono County, California. The project location is shown on the Location Map in the Appendix. The existing roadway is paved to a 22-foot width with variable width gravel shoulders. The proposed section is planned to be 26 feet wide, with two 11-foot lanes and 2-foot paved shoulders. In addition, curve widening will be added to several horizontal curves, and intersection improvements will be made to improve sight distance. The design of the project is also being coordinated with a bike path project being developed by the Town, which affects three locations of Lake Mary Road.

III. EXISTING CONDITIONS

A. EXISTING BASIN CONDITIONS

Lake Mary Road is situated within the Mammoth Creek drainage basin, also called the Mammoth Basin. The project area is within a sub-basin known as the Lakes Basin. This is the only basin within the Mammoth Creek drainage system for which lake storage is a significant factor. Lakes adjacent to the roadway within the 2.8 mile project area include Horseshoe Lake, Lake Mamie, Lake Mary, and Twin Lakes. These lakes provide runoff storage volume of peak flows within the major drainage crossings of the roadway. Most storm runoff from rainfall or snowmelt within the basin is directed to and captured by these various lakes, mostly notably Lake Mamie and Lake Mary. Outflow from these two lakes is channeled through a series of weirs and other control structures into Twin Lakes, near the end of the project. It is estimated that the outflow peak at each lake is significantly lower than the inflow peak due to the storage volume capacity.

The basin is a relatively broad, easterly trending valley confined by the Sierra Nevada mountain range on the south and west, and a series of lower knolls on the north. The terrain in the project area has a considerable variation in slope, and approximately 60 percent of the basin consists of land which has a slope steeper than 30 percent.

Hydrologic soils types (NRCS) within the basin consist mainly of Type "B" and "C" soils, with low to moderate runoff potential. A small percentage of the basin consists of Type "D" soils, with high runoff potential. Most of the soils have been classified as having moderate erosion hazard potential and medium vegetative productivity potential. Existing vegetation adjacent to the roadway consists mostly of coniferous forest, ranging from medium to high density of coverage. Much of the upland area, especially near the south end of the project, is noted in the Master Plan as barren, which likely means little to no tree cover, but with a vegetative ground cover to prevent erosion.

B. EXISTING CULVERT CONDITIONS

Prior to the reconnaissance inspection, an old plan set for Lake Mary Road, dated 1934, was reviewed for culvert locations, sizes, and materials. This helped to locate existing culverts in the field during the inspection. The culvert locations found in the field generally matched what was shown on the plans, although a few discrepancies were noted; some additional culverts not shown on the plans were found, and some of the culverts noted on the plans were not found due to dense ground cover, or submergence by outflow from the lakes. During the inspection, the general condition of each culvert was noted, including the inlet and outlet conditions, and a preliminary recommendation was made. This 3R project is not intended for numerous culvert additions or replacements. Most of the existing culverts are

recommended to remain, since they are in good condition and hydraulically adequate. Others are recommended to remain due to impacts that would be caused by replacing them; some are in deep fill locations, and two appear to have active outflow from Lake Mamie or Lake Mary. For many of the culverts to remain, other recommendations have been made, such as cleaning the inlet and/or outlet areas, extending the culvert, or adding outlet protection. There are also two locations with drop inlets where the culvert can remain, but the inlet structure needs to be replaced. Some of the existing pipes are in poor or fair condition and will need to be replaced. A summary table of the existing culverts with recommendations at each location is in the Appendix. It should be noted that these are preliminary recommendations, and each culvert will be further assessed during the 30% field review. Final recommendations at each location will consider pipe condition, capacity, constructibility, cost, and impacts to the forest environment, lakes, and connected ecosystem.

IV. DRAINAGE DESIGN CRITERIA

A. RESEARCH AND DATA GATHERING

Work efforts to date have consisted of collecting drainage basin data from the Town of Mammoth Lakes and the Forest Service. The Town has a Design Manual for Storm Drainage and Erosion Control, as well as a Storm Drainage Master Plan. The runoff calculations procedure described in the Town's Design Manual is a form of the rational method, and applies to all developed areas, as well as undeveloped basins up to 1,600 acres (2.5 square miles). For basins larger than 1,600 acres, the procedure is based on a flow-frequency analysis, which is developed from gauged stream flow data rather than precipitation data. None of the basins *directly tributary* to the roadway within the project are this large. The existing culvert crossings at Stations 603+50 and 630+00 are active outflow from Lake Mamie and Lake Mary, respectively. The total tributary area to these lakes, including outflow from other lakes further upstream, is approximately eight square miles. Neither of these minor culverts is recommended for replacement. There is a streamflow gauge at the Lake Mamie bridge crossing outlet, which was monitored by the Mammoth County Water District from 1980-1983.

In addition to the Town's manuals, the Inyo National Forest Land and Resource Management Plan was obtained, which provides guidelines on erosion control, water quality, and general roadway and drainage design practices. This Plan will be used as a guide throughout the design process.

B. HYDROLOGIC CRITERIA

The hydrology approaches described in the Town's Design Manual are not recommended for analysis and design of culverts for the Lake Mary Road project. The rational method is best suited for small basin areas and only reflects average peak flows. Additionally, the runoff coefficient and rainfall

intensity have the potential to misrepresent actual infiltration conditions and distribution of the rainfall event. The flow-frequency method is based on stream flow data from observed stream gauge stations, and intended for much larger watersheds (regional basins in excess of 2.5 square miles) and not intended for minor culvert drainage.

Two other hydrologic methodologies will be used for the project. The USGS National Flood Frequency (NFF) program uses current statewide regression equations to estimate flood magnitude and frequency on ungaged watersheds. This method is appropriate for areas with a lot of snowmelt. For comparison, the NRCS TR-55 method will also be used, which will account for infiltration losses in the soil and can be evaluated for 24-hour rainfall, which is recommended for this project. The TR-55 approach is also consistent with the recommended hydrology guidelines presented in the CFLHD Project Design and Development Manual (PDDM).

Neither of these methodologies account for significant storage. However, none of the proposed culvert replacements are influenced by storage from Lake Mamie or Lake Mary. Although basin delineations will be done for all existing culvert crossings, hydrologic computations will be done only for those that are recommended for replacement.

The other reason that the design criteria in the Town's Design Manual will not apply to the project is that the Forest Service owns the portion of Lake Mary Road within the project area. The portion of the road on National Forest Lands is under a Road Use Permit held by the Town of Mammoth Lakes. Since jurisdiction of the route lies within the Inyo National Forest, CFLHD criteria will apply. Peter Bernasconi, Associate Civil Engineer for the Town, verified that the use of CFLHD criteria is appropriate and acceptable for the project.

Although the Town's Design Manual and Master Plan will not govern the design criteria, these manuals will provide much valuable information for use in the drainage design. The reports include several maps and exhibits, which show major basins, hydrologic soils information, land use, land slopes, and basin vegetation. These exhibits are included in the Appendix. This data will be used to determine the time of concentration and runoff curve numbers for the basins impacting the roadway. Rainfall isopluvial maps from NOAA (Atlas 2) have also been obtained, and hydrologic computations will be furnished in a Draft Hydraulics Report.

C. HYDRAULIC CRITERIA

Culverts

Based on the current and future ADT of the roadway (>1500), and its classification as a Collector, culvert replacements will be designed for the 50-year storm event. The minimum culvert size will be 24". End treatment will consist of concrete headwalls with rock riprap outlet protection.

Floodplains

The effective Flood Insurance Rate Map (FIRM) shows the existing 100-year floodplain in the vicinity of the project. The floodplain areas consist only of the lake footprints themselves. Portions of the roadway adjacent to Lake Mamie and Lake Mary are very close to the lakes, so care will be taken to ensure that the roadway design will not impact their respective floodplains.

Fish Passage

The only major drainage crossing within the project is Lake Mamie bridge, at Station 599+30. Discharge under this bridge structure is based on a controlled release from the lake. There is a spillway and control structure on the downstream side of the bridge. This bridge was just reconstructed in the year 2000, and no improvements to the structure are proposed with this project, other than potential modifications to the guardrail approaches.

The Forest Plan, as well as the Water Quality Control Plan for the Lahontan Region, requires that culverts on stream crossings be designed to accommodate fish passage. Other than the Lake Mamie bridge, there are no other live (perennial) stream crossings within the project area, so the need to accommodate fish passage with proposed culvert replacements is not anticipated. This will be verified during the 30% field review.

V. EROSION CONTROL AND WATER QUALITY

A preliminary erosion and sediment control concept will be developed for the project. This concept will consist of measures that serve as Best Management Practices (BMP's) for water quality during construction, as well as permanent measures. The BMP's will include controls such as silt fence, inlet protection, and riprap outlet protection at culverts. Roadside ditches will also be evaluated for erosion potential. In later phases of the design, the erosion control plan will be coordinated with the California Regional Water Quality Control Board (Lahontan Region). This Board may also require a permit for the proposed culvert replacements.

The Bodle Ditch is a large, historic irrigation channel that parallels Lake Mary Road from approximate Stations 648+00 to 669+00, where it then crosses the roadway and flows to the east, toward Old Mammoth City. The Mammoth Community Water District releases water from Lake Mary into the Bodle Ditch from May through October. No improvements to the ditch or culvert crossing are proposed, but care must be taken to prevent sediment from going into the ditch during construction.

Another issue to be addressed with the project is the historic problems that have occurred due to snow storage. During plowing operations, there is no room within narrow cut sections on the side of the roadway for storage, so it is moved to fill areas where there is more room. During spring snowmelt, there is then a large concentration of runoff at locations where snow has

been stockpiled, which has caused some erosion problems. This could be mitigated with the implementation of riprap lined ditches or rundowns in these areas. Coordination will be required with the Forest Service and the Town of Mammoth Lakes on their snow removal and storage practices, as well as noting the specific locations where there have historically been problems that need to be mitigated.

VI. SUMMARY

It is recommended that the CFLHD Project Design and Development Manual be used for drainage criteria with a 50-year recurrence interval used for the analysis of the cross culverts. Pipe materials will be what is allowed in the PDDM and can include corrugated steel pipe (CSP), reinforced concrete pipe (RCP), or high-density polyethylene plastic (HDPE). The final recommendation for each existing culvert location will be based on consideration of all pertinent criteria and constraints, with input and acceptance by the appropriate Forest Service and FHWA personnel. The preferred hydrology methods are regression analysis using the NFF program, and TR-55, which is consistent with the PDDM. It is not anticipated that the project will impact the floodplains of Lake Mamie and Lake Mary. It is recommended to monitor water quality during construction of this project. Erosion and sediment control devices should be implemented during construction activity to control and prevent polluted storm runoff from entering the receiving waters, including the Bodle Ditch. Water quality control will be further discussed in the Draft Hydraulics Report.

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APPENDIX

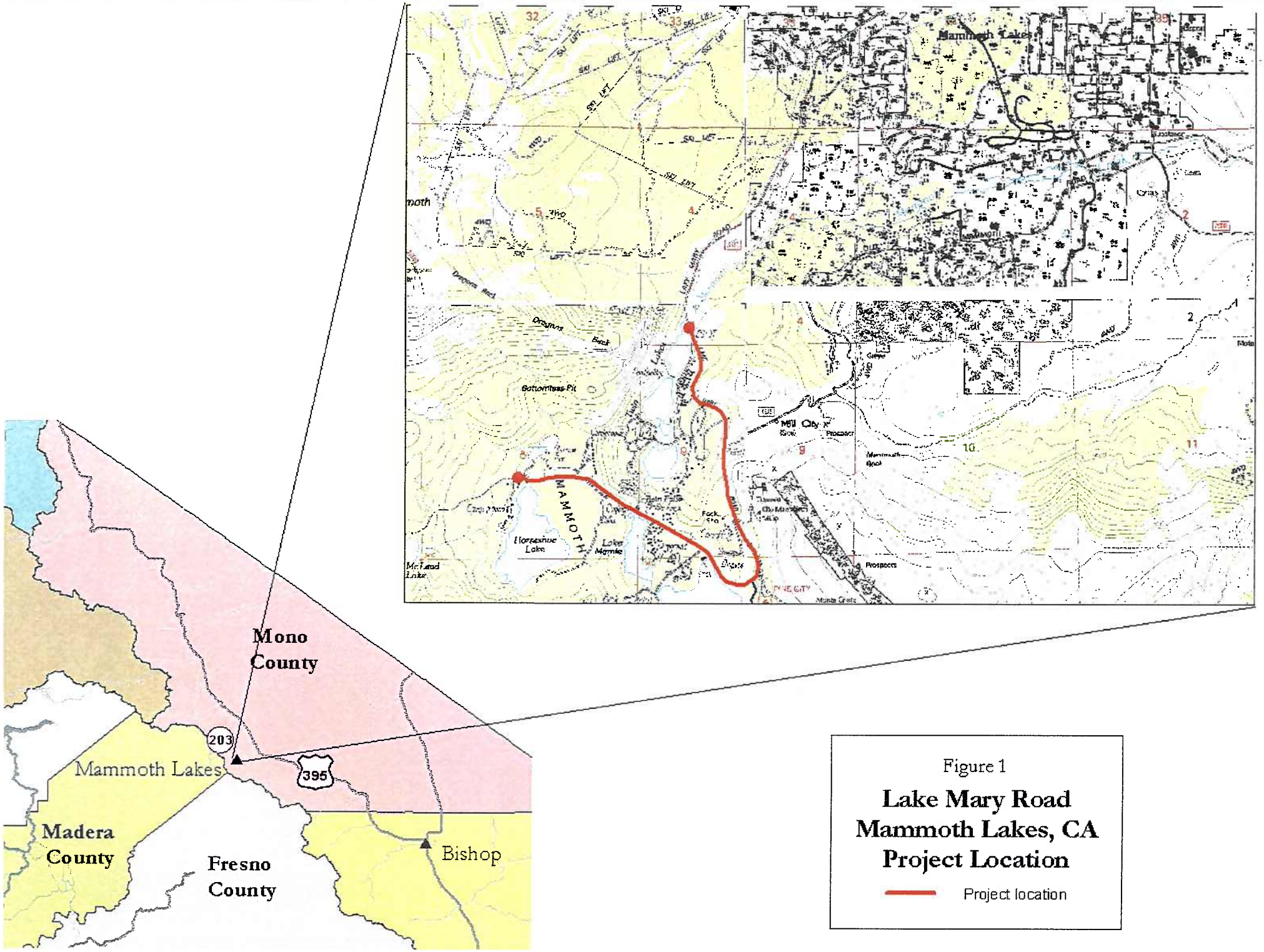


Figure 1

Lake Mary Road
Mammoth Lakes, CA
Project Location

Project location

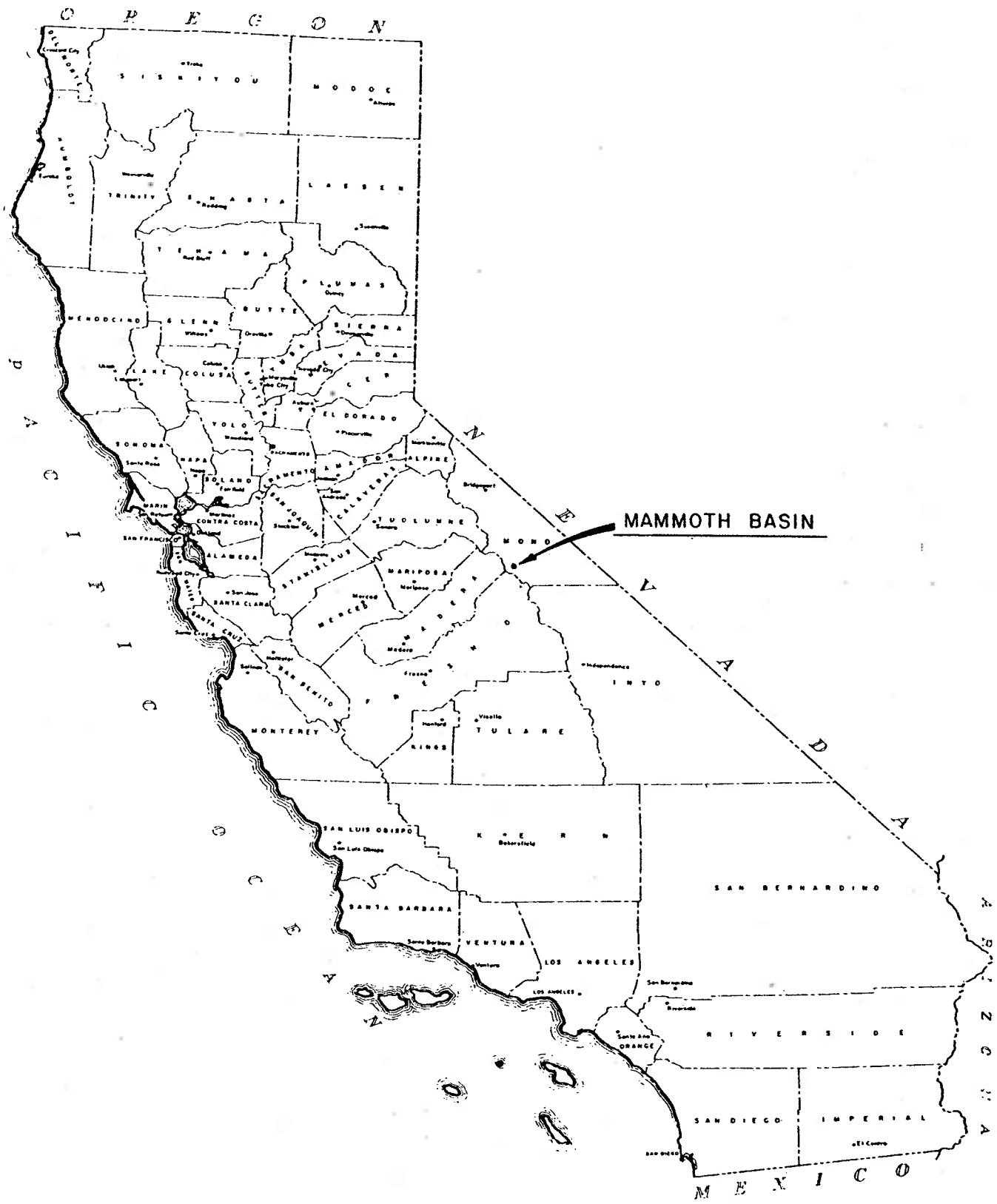


Figure 3-1
LOCATION MAP

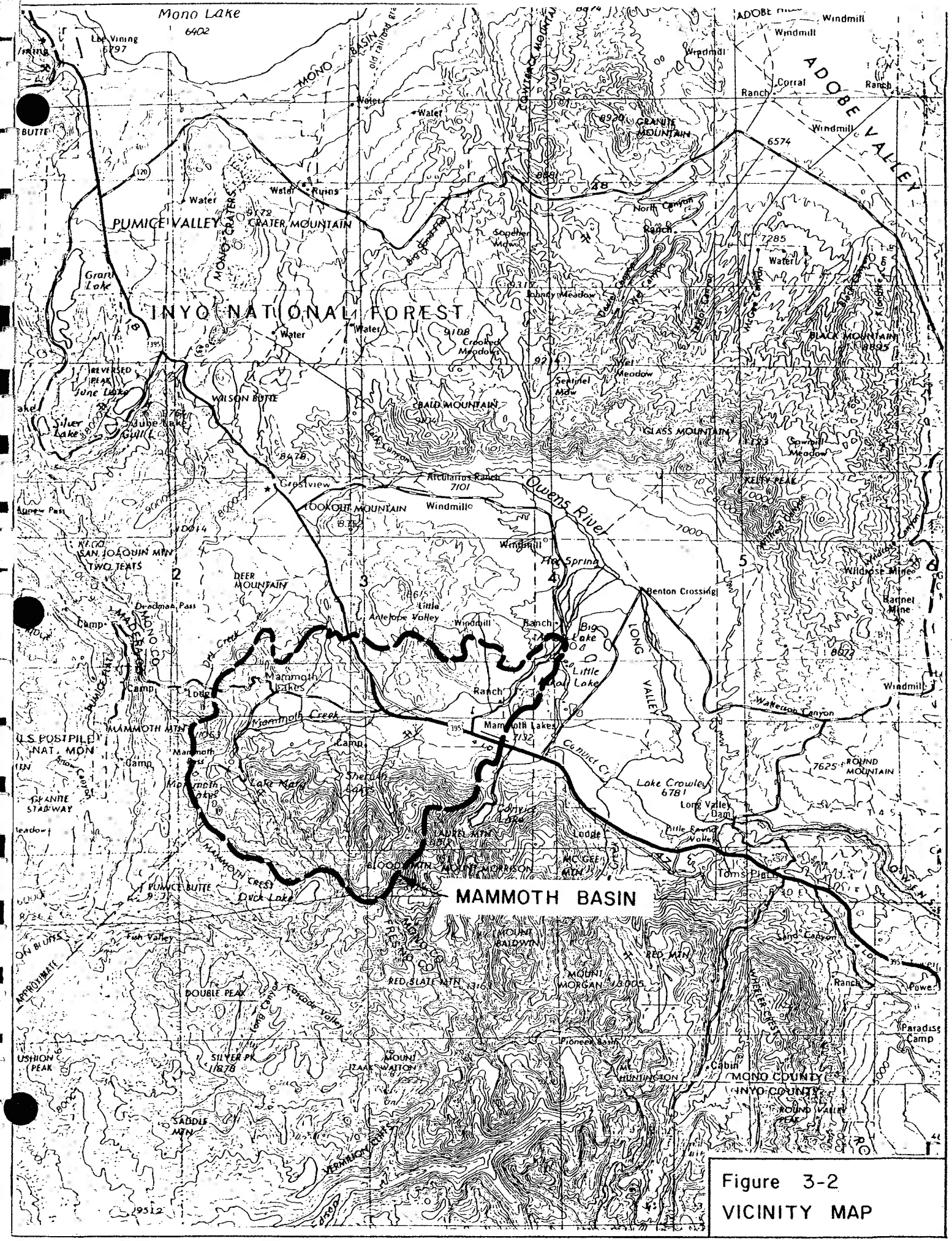


Figure 3-2
VICINITY MAP

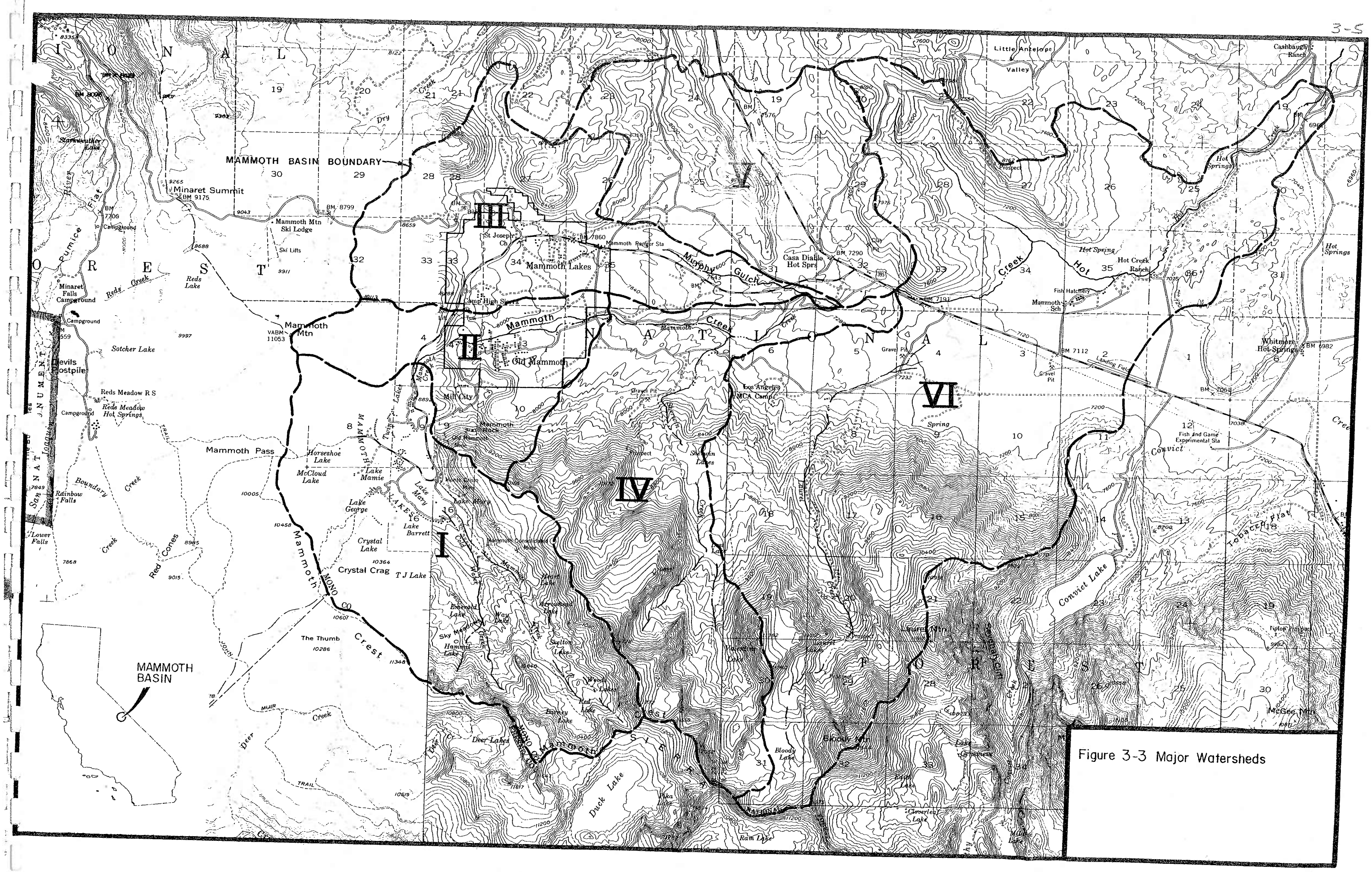


Figure 3-3 Major Watersheds

Table 3-1. Mammoth Basin Watersheds

Watershed	Descriptive name	Area, acres
I	Lakes Basin	6,920
II	Old Mammoth	2,710
III	Murphy Gulch	5,120
IV	Sherwin Creek	7,310
V	Casa Diablo	5,050
Subtotal	Mammoth Creek	27,110
VI	Hot Creek and Laurel Creek	17,990
Total Basin		45,100

Watersheds I through V comprise the major tributary areas of Mammoth Creek upstream of State Highway 395. Downstream of Highway 395 (where the stream name changes to Hot Creek), all of the remaining Basin area has been simply lumped into Watershed VI, even though minor drainage distinctions could be made.

Watershed I encompasses the Lakes Basin which is the most distinct and complex tributary area within the Mammoth Creek drainage system. It is the only watershed for which lake storage is a significant factor because it contains the largest and most numerous lakes within the Mammoth Basin. Watershed II is immediately downstream of area I, and includes those portions of the Mammoth Lakes community and Mammoth Mountain which are directly tributary to Mammoth Creek. Watershed III encompasses a somewhat separate drainage system, known as Murphy Gulch, which is eventually tributary to Mammoth Creek near Highway 395. This watershed contains most of the more intensely developed areas of the Mammoth Lakes community.

Drainage Subareas

Watersheds II and III contain all of the private land holdings of the Mammoth Lakes community, and are the primary areas of interest in this study. These two watersheds have been further divided into more detailed drainage subareas as shown on Figure 3-4. Watershed II contains four distinct drainage subareas labeled II-1 through II-4, which are directly tributary to the main stream channel of Mammoth Creek. Watershed III has been subdivided into nine areas, labeled III-1 through III-9, which are all tributary to the Murphy Gulch drainage system.

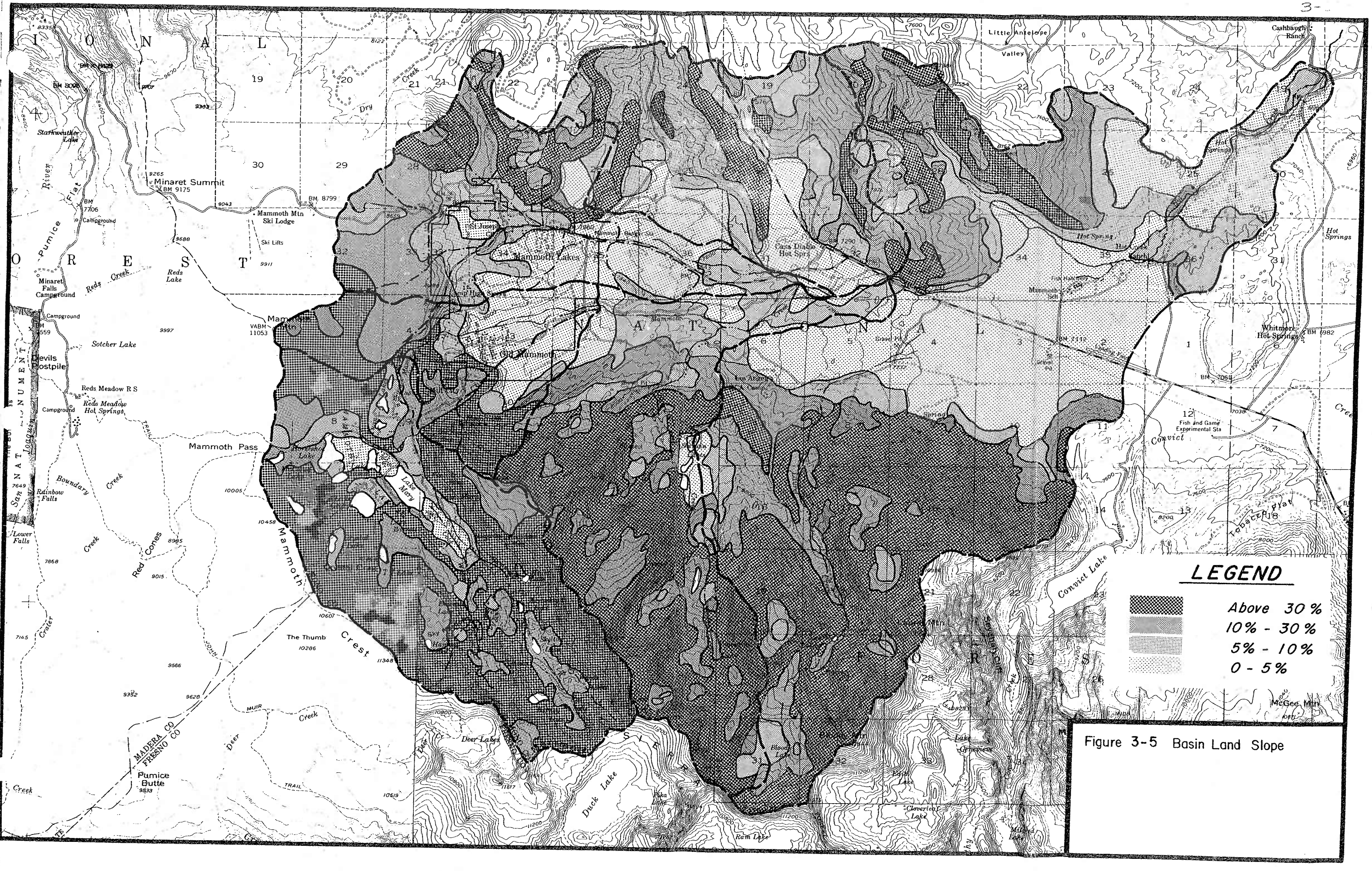


Figure 3-5 Basin Land Slope

Table 3-2. Slope Analysis

Major watershed	Drainage area	Total area, acres	0 to 5 percent		5 to 10 percent		10 to 30 percent		Over 30 percent	
			Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
I		6,920	567	8.2	612	8.8	1,578	22.8	4,163	60.2
	II-1	819	359	43.8	114	13.9	26	3.2	320	39.1
	II-2	532	349	65.6	53	10.0	70	13.1	60	11.3
	II-3	639	193	30.2	44	6.9	167	26.1	235	36.8
	II-4	720	--	--	--	--	290	40.3	430	59.7
II		2,710	901	33.3	211	7.8	553	20.4	1,045	38.5
	III-1	690	408	59.1	272	39.4	--	--	10	1.5
	III-2	350	310	88.6	40	11.4	--	--	--	--
	III-3	206	206	100.0	--	--	--	--	--	--
	III-4	644	161	25.0	103	16.0	187	29.0	193	30.0
	III-5	811	281	34.7	255	31.4	275	33.9	--	
	III-6	819	--	--	172	21.0	280	34.2	367	44.8
	III-7	265	66	24.9	179	67.5	20	7.6	--	--
	III-8	580	--	--	167	28.8	281	48.4	132	22.8
	III-9	755	--	--	145	19.2	436	57.8	174	23.0
III		5,120	1,432	28.0	1,333	26.0	1,479	28.9	876	17.1
IV		7,310	570	7.8	1,280	17.5	1,725	23.6	3,735	51.1
V		5,050	1,005	19.9	1,540	30.5	1,434	28.6	1,071	21.2
Totals		27,110	4,475	16.5	4,976	18.4	6,769	25.0	10,890	40.1

Table 3-3. Watershed Characteristics

Major watershed	Drainage area	Elevation, feet		Basin length, feet	Average slope, percent	Total area, acres	Natural area, acres	Developed area,[a] acres
		High	Low					
I		11,600	8,400	39,600	8.1	6,920	6,920	-0-
II		11,130	7,820	13,730	24.1	2,710	1,661	1,049
	II-1	10,160	7,840	13,200	17.6	819	556	263
	II-2	8,700	7,820	13,730	6.4	532	92	440
	II-3	9,700	7,840	13,200	14.1	639	308	331
	II-4	11,130	8,500	11,090	23.7	720	705	15
III		10,110	7,380	29,700	9.2	5,120	3,508	1,612
	III-1	8,200	7,380	17,420	4.7	690	690	-0-
	III-2	7,900	7,650	4,800	5.2	350	52	298
	III-3	8,020	7,800	6,000	3.7	206	19	187
	III-4	8,760	7,720	9,000	11.6	644	543	101
	III-5	9,300	7,840	13,200	11.1	811	146	665
	III-6	9,380	8,000	10,560	13.0	819	760	59
	III-7	8,500	7,940	7,000	8.0	265	44	221
	III-8	9,380	7,940	7,920	18.0	580	510	70
	III-9	10,110	8,300	6,330	28.6	755	744	11
IV		11,760	7,190	44,880	10.2	7,310	7,310	-0-
V	III-9	8,760	7,200	31,680	4.9	5,050	5,050	-0-
VI	III-9	11,760	6,960	63,360	7.6	17,990	17,990	-0-
Totals						45,100	42,439	2,661

[a]Area within boundary of community of Mammoth Lakes, plus areas proposed for community expansion.

Runoff Potential

A	Very low runoff potential
B	Low runoff potential
C	Moderate runoff potential
D	High runoff potential

Soil Depth

1	0 to 20 inches
2	20 to 36 inches
3	More than 36 inches
4	Variable conditions

Inherent Erosion Hazard

1	Low hazard
2	Moderate hazard
3	High hazard

Vegetative Productivity

1	Low potential
2	Medium potential
3	High potential

Soil types within the Basin are mapped on Figure 3-7 and summarized by watersheds and subareas in Table 3-5. The mapping symbols represent the above described characteristics in accordance with the following code:

Soil Symbol (Example B322)

B	3	2	2
Runoff potential--low	Soil depth--over 36 inches	Erosion hazard--moderate	Vegetative productivity--medium

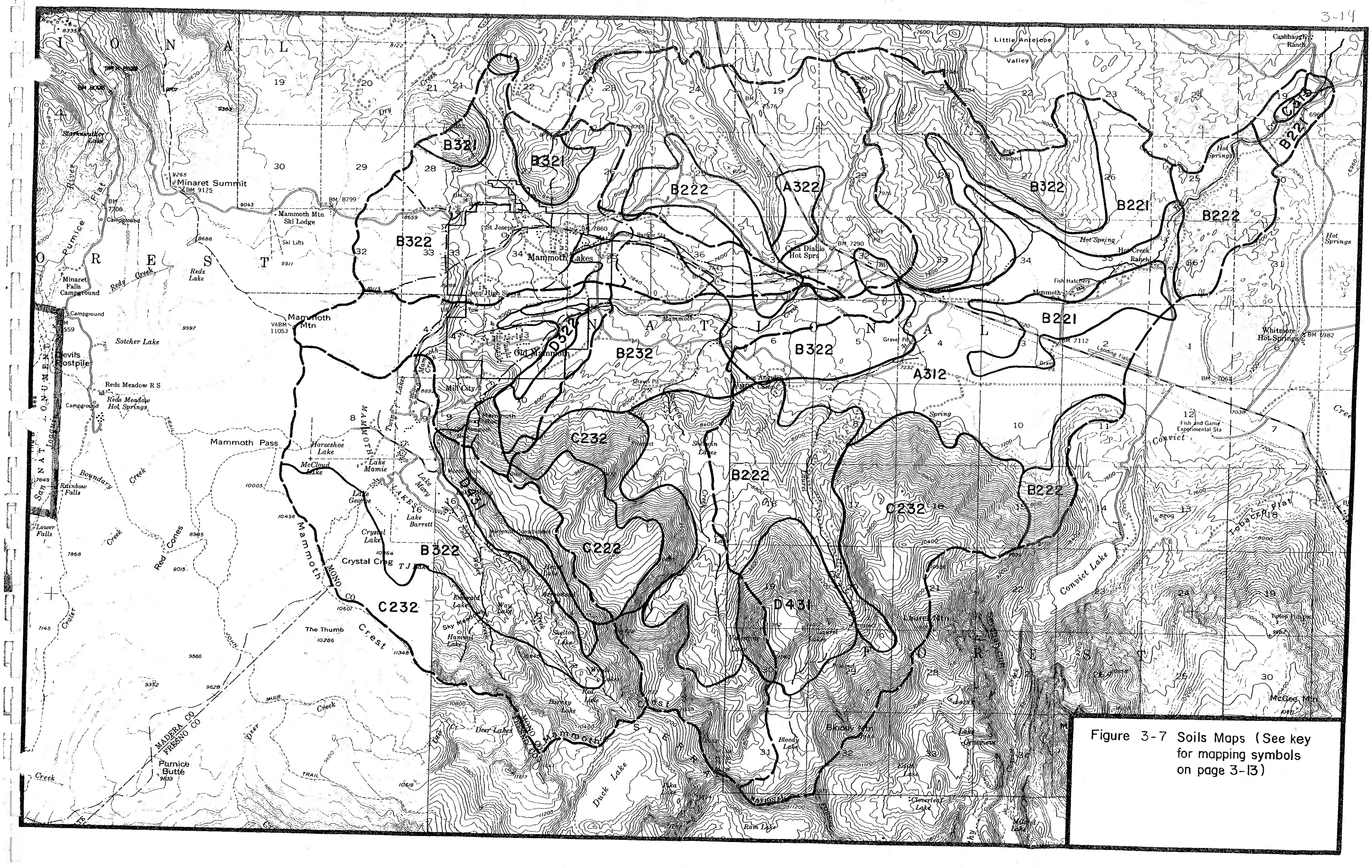


Figure 3-7 Soils Maps (See key for mapping symbols on page 3-13)

Table 3-5. Soil Type Distribution

Major watershed	Drainage subarea	Soil Code/Percentage of Area									
		A312	A322	B222	B232	B321	B322	C222	C232	D322	D431
I		—	—	—	—	—	45.0	4.4	47.0	—	3.6
II		—	—	—	20.9	—	61.2	6.9	0.9	9.4	0.7
	II-1	—	—	—	53.9	—	10.5	16.7	2.9	16.0	—
	II-2	—	—	—	24.6	—	62.8	—	—	12.6	—
	II-3	—	—	—	—	—	80.8	7.1	—	9.2	2.9
	II-4	—	—	—	—	—	100.0	—	—	—	—
III		—	—	2.3	10.9	15.9	70.9	—	—	—	—
	III-1	—	—	14.9	8.5	—	76.6	—	—	—	—
	III-2	—	—	—	97.6	—	2.4	—	—	—	—
	III-3	—	—	—	53.5	—	46.5	—	—	—	—
	III-4	—	—	—	1.6	28.4	70.0	—	—	—	—
	III-5	—	—	—	—	—	100.0	—	—	—	—
	III-6	—	—	2.0	—	57.9	40.1	—	—	—	—
	III-7	—	—	—	—	—	100.0	—	—	—	—
	III-8	—	—	—	—	29.1	70.9	—	—	—	—
	III-9	—	—	—	—	—	100.0	—	—	—	—
IV		0.3	—	14.0	18.4	—	5.1	43.5	18.7	—	—
V		2.3	6.2	13.1	—	—	78.4	—	—	—	—

Vegetation

Vegetative types found in the Basin are generally typical of the eastern Sierra region. The Basin includes portions of the Upper Sonoran life zone, the Canadian zone, and the Transition life zone, although there is considerable intermixing and classical zonal boundaries are not sharply delineated. General plant communities include the lodgepole pine-fir forest, montane chaparral, sagebrush scrub, meadow, riparian woodland, and grassland.

Vegetative types are mapped on Figure 3-8 and summarized by watersheds and subareas in Table 3-6 according to the following legend:

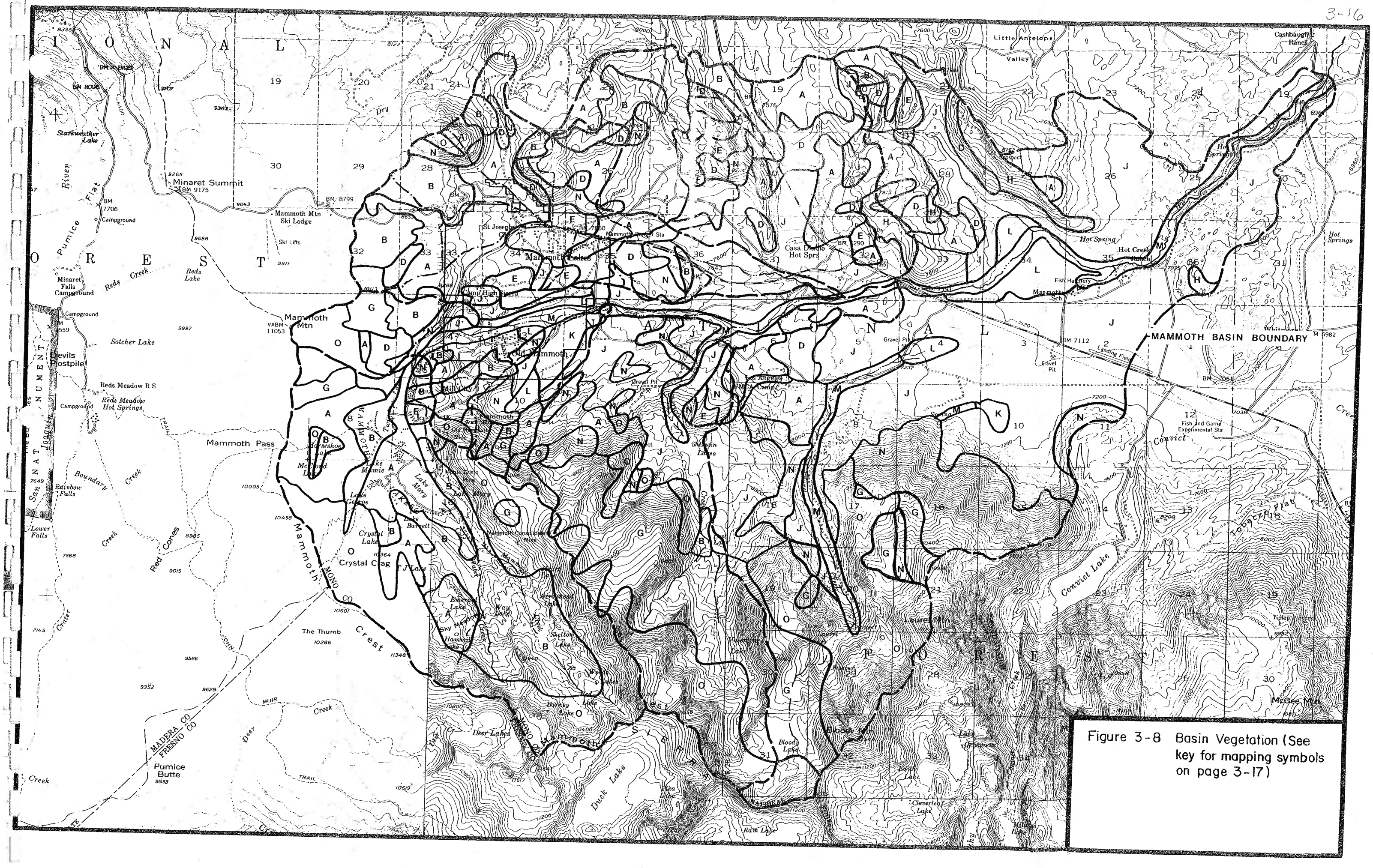


Figure 3-8 Basin Vegetation (See key for mapping symbols on page 3-17)

Code	Dominant Vegetative Type[a]	
A	Coniferous forest	>11 inches, 10 to 40 percent
B	Coniferous forest	>11 inches, 40 to 70 percent
C	Coniferous forest	>11 inches, over 70 percent
D	Coniferous forest	<11 inches, 10 to 40 percent
E	Coniferous forest	<11 inches, 40 to 70 percent
F	Coniferous forest	<11 inches, over 70 percent
G	Subalpine forest	
H	Pinyon-Juniper woodland	
I	Deciduous forest	
J	Rangeland	
K	Grassland	
L	Natural meadow or pasture	
M	Riparian	
N	Mountain brush or chaparral	
O	Barren	

[a]Coniferous forest designation are: >11 inches and <11 inches--meaning trees of diameter greater than or less than 11 inches. Percent values indicate the density of coverage.

Table 3-6. Vegetative Cover Analysis

Major watershed	Drainage subarea	Vegetative Type/Percent of Area														
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
I		28.9	12.5	—	0.1	0.8	—	9.7	—	—	—	—	0.1	2.4	1.4	44.1
II		15.7	11.7	—	5.3	3.8	—	9.4	—	—	10.5	6.9	7.6	9.5	8.0	11.6
	II-1	15.7	2.8	—	—	—	—	5.1	—	—	16.2	23.6	10.5	17.0	0.1	—
	II-2	1.6	1.6	—	4.8	16.8	—	—	—	—	30.5	—	13.3	16.4	16.0	—
	II-3	45.5	14.4	—	—	2.9	—	—	—	—	—	—	9.2	6.1	7.8	14.1
	II-4	1.7	25.1	—	15.0	0.7	—	27.0	—	—	—	—	—	—	1.7	28.8
III		39.4	20.1	—	10.3	5.9	—	1.5	—	—	16.1	—	—	—	6.2	0.5
	III-1	9.8	4.3	—	8.4	—	—	2.9	—	—	71.5	—	—	—	3.0	—
	III-2	—	12.7	—	26.2	—	—	—	—	—	31.2	—	—	—	29.9	—
	III-3	9.7	—	—	44.0	20.5	—	—	—	—	25.9	—	—	—	—	—
	III-4	38.1	19.7	—	14.8	14.9	—	—	—	—	—	—	—	—	12.6	—
	III-5	61.9	4.0	—	—	22.0	—	—	—	—	12.0	—	—	—	—	—
	III-6	71.7	7.2	—	8.8	1.1	—	—	—	—	3.5	—	—	—	7.4	—
	III-7	93.6	4.2	—	—	2.1	—	—	—	—	—	—	—	—	—	—
	III-8	29.8	55.9	—	—	—	—	—	—	—	—	—	—	—	9.3	5.0
	III-9	37.3	47.7	—	8.9	—	—	6.1	—	—	—	—	—	—	—	—
IV		3.0	0.2	—	0.8	1.2	—	9.9	—	—	25.5	0.3	0.2	2.8	6.0	50.1
V		46.0	12.3	—	14.9	1.2	7.1	0.8	4.0	—	11.2	—	—	—	2.6	—

Hydrologic Records

There are seven precipitation gauging stations in the general vicinity of the Basin, but only three stations within the Basin itself: Lake Mary Store, Mammoth Ranger Station, and Mammoth Pass. The Lake Mary Store and the Mammoth Pass gauges have over 35 years of record, but the Mammoth Ranger Station gauge has only been in operation for four years.

Similarly, although there are four streamflow gauging stations within the Basin, only one has been in long-term operation. Streamflow records for Mammoth (Hot) Creek at the Highway 395 crossing have been maintained by the City of Los Angeles for over a 50-year period. The flow recorded at this location essentially represents the surface outflow from all of Watersheds I through V.

The location of precipitation and streamflow gauging stations within the Basin is shown on Figure 3-11. Table 3-9 lists the data stations, the information collected, and the period of record for all gauging points in the general vicinity.

Table 3-9. Precipitation and Streamflow Data[a]

Gaging station location	Agency	Type of data	Method of collection	Period of record
Lake Mary Store	LADWP	Precipitation	Continuous chart, summarized as daily volumes	1946-present
Reds Meadow	USFS	Precipitation	Daily record	1979-1983
Mammoth Mountain	USFS	Precipitation	Daily record	1979-1983
Little Hot Creek	USFS	Precipitation	Daily record	1979-1983
Mammoth Ranger Station	USFS	Precipitation	Daily record	1979-1983
Convict Lake Sewage Plant	USFS	Precipitation	Daily record	1979-1983
Mammoth Pass	USBR	Precipitation	Storage gage	1949-present
Lake Mamie Outlet	MCWD	Streamflow	Continuous chart	1980-1983
Mammoth Creek at Old Mammoth Road	MCWD	Streamflow	Continuous chart	1980-1983
Hot Creek at Highway 395	LADWP	Streamflow	Continuous chart, summarized as average daily flows	1931-1983
Hot Creek at the Gorge	LADWP	Streamflow	Continuous chart, summarized as average daily flows	1972-1983

[a]LADWP = Los Angeles Department of Water and Power.
USFS = U.S. Forest Service.
USBR = U.S. Bureau of Reclamation.
MCWD = Mammoth County Water District.

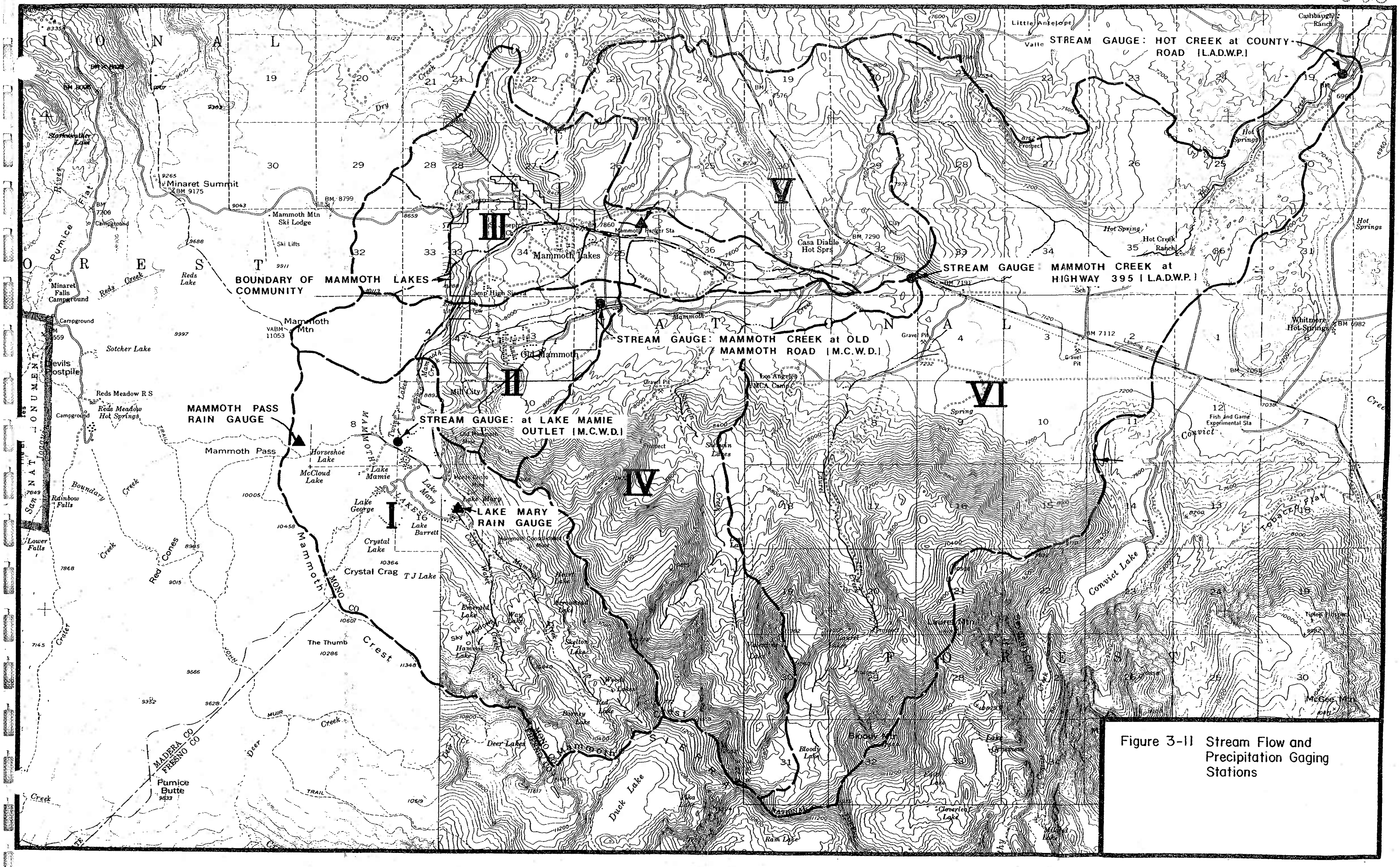


Figure 3-11 Stream Flow and Precipitation Gaging Stations

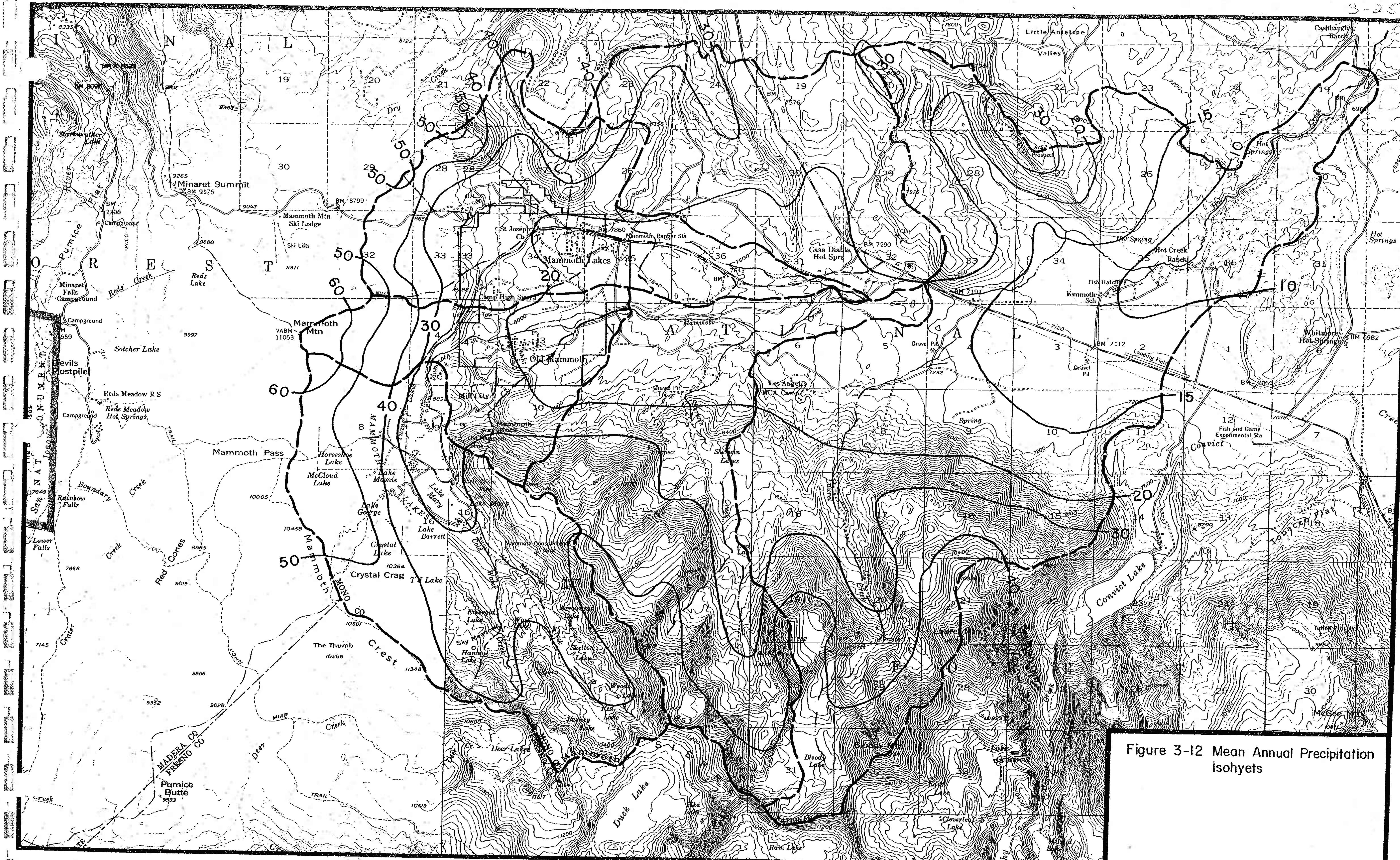


Figure 3-12 Mean Annual Precipitation Isohyets

Table 5-3. Erosion Control Guidelines Adopted by Lahontan Regional Board

1	Drainage collection, retention, and infiltration facilities shall be constructed and maintained to prevent transport of the runoff from a 20-year, 1-hour design storm from the project site.[a]
2	Surplus or waste material shall not be placed in drainage ways or within the 100-year flood plain of surface waters.
3	All loose piles of soil, silt, clay, sand, debris, or earthen materials shall be protected in a reasonable manner to prevent any discharge to waters of the State.
4	Dewatering shall be done in a manner so as to prevent the discharge of earthen material from the site.
5	All disturbed areas shall be stabilized by appropriate soil stabilization measures by October 15 of each year.
6	All work performed between October 15 and May 1 of each year shall be conducted in such a manner that the project can be winterized within 48 hours.
7	Where possible, existing drainage patterns shall not be significantly modified.
8	After completion of a construction project, all surplus or waste earthen material shall be removed from the site and deposited at a legal point of disposal.
9	Drainage swales disturbed by construction activities shall be stabilized by the addition of crushed rock or riprap as necessary or other appropriate stabilization methods.
10	All nonconstruction areas shall be protected by fencing or other means to prevent necessary disturbance.
11	During construction, temporary erosion control facilities (e.g., impermeable dikes, filter fences, hay bales, etc.) shall be used as necessary to prevent discharge of earthen materials from the site during periods of precipitation or runoff.
12	Revegetated areas shall be continually maintained in order to assure adequate growth and root development. Physical erosion control facilities shall be placed on a routine maintenance and inspection program to provide continued erosion control integrity.
13	Where construction activities involve the crossing and/or alteration of a stream channel, such activities shall be timed to occur during the period in which stream flow is expected to be lowest for the year.

[a]The 20-year, 1-hour design storm for the Mammoth Lakes area is equal to 1.0 inch (2.5 cm).

From: Inyo National Forest Land and Resource Management Plan

facilities can best be served by a community-wide system proposed by another entity.

- Provide trails for hikers, skiers, equestrians, bicyclists, snowmobilers, the handicapped, and off-highway vehicle users when compatible with user needs, level of development, and Forest goals and objectives.

- Maintain trails to assigned maintenance levels.

- Coordinate trail construction, rerouting, improvement, and maintenance with cooperating or affected agencies.

- Separate incompatible trail uses where feasible.

- Utilize existing developed facilities, roads, and trails for both summer and winter recreation activities, whenever possible, before developing new ones for exclusive seasonal use.

Fish

Threatened and Endangered Fish

- Rehabilitate and maintain essential habitat for these species according to species' recovery plans and Memoranda of Understanding with the California Department of Fish and Game and the U.S. Fish and Wildlife Service.

- Provide high quality habitat for threatened and endangered fish species based on the results of habitat capability model analyses.

- Manage all stream reaches of essential habitat as depicted in the Recovery Plan to the following guidelines in consultation with the U.S. Fish and Wildlife Service.

  1. Do not allow any activity that results in more than 10 percent degradation of the habitat within any given stream reach; this conclusion must be supported by data that results from the use of a quantitative methodology survey such as GAWS, COWFISH, etc.

  2. Restore unstable or eroding streambanks to attain a streambank system that is no more than 10 percent unstable at any given time.

  3. Retain vegetation adjacent to perennial streams that affords stream shading and streambank stability.

Fisheries

- Provide medium- to high-quality habitat for resident fish species based on the results of the appropriate habitat capability model.

- Manage all stream reaches of all state designated wild trout waters according to the following:

1. Any activity that results in trampling and chiseling should not exceed 10 percent of any given stream reach. A reach is defined as a continuous portion of a stream with homogeneous physical characteristics. Use the current situation as documented in the Final Environmental Impact Statement (EIS) as a reference point.

2. Restore unstable or eroding streambanks to attain a streambank system that is no more than 10 percent unstable at any given time.

3. Streamside vegetation should provide a minimum of 90 percent of the habitat's capability to provide stream shading and fish cover.

- Manage all stream reaches containing resident fish according to the following:

    1. Any activity that results in trampling and chiseling should not exceed 20 percent of any given stream reach. Use the current situation as documented in the EIS as a reference point.

    2. Restore unstable or eroding streambanks to attain a streambank system that is no more than 20 percent unstable at any given time.

- Prohibit stream-modifying construction activities within or immediately adjacent to the aquatic zone during the following spawning seasons:

    1. in streams with spring spawning species (rainbow, cutthroat, and golden trout), February 15-August 20;

    2. in streams with fall spawning species (brown and brook trout), October 1-April 15.

  Exceptions to (1) and (2) above must be approved by the Forest Supervisor.

- Design stream crossings to accommodate fish passage where proposed roads and trails will cross streams that support active or potential fisheries.

- Maintain instream flows needed to support existing resident fisheries.

- Maintain water levels in reservoirs and natural lakes to support fisheries to at least existing levels.

- Negotiate with the Federal Energy Regulatory Commission (FERC) and the affected utility companies to rewater selected reaches of streams for the re-establishment of resident trout fisheries.

- Coordinate with the California Department of Fish and Game to establish standards for viable populations and tolerable levels of depletion for resident fish species.

- Rehabilitate and/or enhance the visual resource when implementing projects, where appropriate as follows:

  1. Rehabilitate the visual resource where the existing visual condition fails to meet the assigned VQO.

  2. Enhance the resource where the existing visual condition appears monotonous, and where there is an opportunity to create visual variety in the landscape through planting, vegetative manipulation, or other accepted means.

  3. Base priorities for rehabilitation and enhancement projects upon the VQO assigned to the project area, corridor viewshed plans, and on the following considerations:

     - The relative importance of the area and the amount of deviation from the adopted VQO.

     - The length of time it would take natural processes to reduce the visual impacts so that they meet the adopted VQO.

     - The length of time it would take rehabilitation measures to meet the adopted VQO.

     - The coordination with the resources necessary to rehabilitate the project area.

- Maintain foregrounds and middlegrounds of the scenic corridors of the following travel routes to Retention and/or Partial Retention VQOs as inventoried, but not less than Partial Retention:

  1. Highways officially designated by the state as California State and County Scenic Highways.

  2. California State Scenic Highway System routes as designated in the September 1970 Master Plan. These highways include:

     - State Highway 120, west of U.S. 395 to Tioga Pass
     - U.S. 395
     - State Highway 158
     - State Highway 203
     - State Highway 168.

- Meet the Retention VQO in all foreground zones of other Sensitivity Level 1 roads and trails, recreation sites, and within all concentrated recreation areas.

Watershed

Soils

- Reduce accelerated soil erosion resulting from management activities to natural background levels within three years after the soil-disturbing activity.

- Conduct an Order 2 Soil Resource Inventory or an on-site soil investigation to evaluate all areas that are scheduled for modification (vegetation manipulation, construction, etc.) or subject to concentrated use.

- Avoid the use of soil-disturbing equipment, OHVs, and trampling by livestock on wet or poorly-drained soils whenever possible.

- Use earth-retaining structures or other special methods as needed on steep slopes or in areas of instability.

- Keep dozer-constructed fire lines as narrow as possible, and provide for concurrent erosion control on areas with long, continuous gouges in areas of shallow, compacted, or highly erodible soils.

- Conserve the surface mineral and/or surface organic layer of the soils by minimizing soil disturbance to maintain long-term productivity.

- Store topsoil on-site in areas subject to mechanical disturbance. Respread as the top layer when the project is completed.

- Avoid land alterations that could potentially cause significant soil erosion and loss of soil productivity.

- Stabilize all areas disturbed by management activities to minimize soil erosion.

- Apply the Best Management Practices (BMPs) from the handbook, "Water Quality Management for National Forest System Lands in California" (U.S.D.A., Forest Service, 1979) when implementing ground-disturbing activities that may reduce the productivity of the landbase or cause surface erosion or mass wasting.

- Require an interdisciplinary review to avoid or mitigate adverse impacts for any projects or activities proposed in areas identified in the soil resource inventories as having an erosion hazard rating of nine or greater.

- Limit disturbance to no more than five percent per decade on that portion of a management area characterized by steep slopes, very high erosion potential, or high instability.

Water

- Maintain or improve water quality to meet state and federal standards. Cooperate and coordinate with state and federal agencies when planning projects that could affect water quality.

- Implement Best Management Practices (BMPs) to meet water quality objectives and maintain and improve the quality of surface water on the Forest. Identify methods and techniques for applying BMPs during project level environmental analysis and incorporate into the associated project plan and implementation documents.

- Secure water rights for existing and foreseeable future National Forest consumptive uses according to state law. Convert all National Forest System water uses into the name of the Forest Service where possible.

- Obtain water availability assurances for existing and foreseeable future nonconsumptive uses through the special use permit and the Federal Energy Regulatory Commission (FERC) "4E Report" processes.

- Manage watersheds with the priority of maintaining and protecting existing healthy watersheds before rehabilitating degraded systems.

- Require the following waterbar spacing on dozer-constructed fire lines:

Slope gradient (%)	Spacing (feet)
1-3	300
4-6	250
7-9	150
10-14	125
15-20	80
21-40	60
41+	40

- Do not channelize natural streams unless there are no other options.

- Maintain instream flows needed to maintain stream channel competence.

- Design construction activities within streams to avoid sedimentation in the aquatic zone.

- Manage all stream reaches to maintain or improve their Stream Channel Stability Rating (SSR) to 110 or less for all domestic water supply watersheds.

- Manage sensitive stream reaches (those with bank protection ratings of 16-20) according to the following guidelines for all domestic water supply watersheds:

  1. Do not allow the sum of trampling and chiseling scores to exceed 20 percent.

  2. Do not permit roads, trails, or livestock paths to cross streams in these reaches unless they are satisfactorily mitigated.

  3. Maintain adequate instream flows to retain soil protecting riparian vegetation.

- Locate roads and trails on natural benches or ridges well away from stream courses and other water bodies where possible. Avoid constructing roads and trails that parallel or cross tributaries to a main stream.

- Use the steepest permissible pitches and grades to avoid paralleling the stream at stream crossings. Design to maintain the existing width:depth ratio of the stream.

- Use repeated treatments, if necessary, to establish vegetation on fill material where bridges or culverts cross streams.

- Heavily armor the streambed both upstream and downstream from each road, trail, and livestock path crossing that has neither a bridge nor a culvert. Give highest priority to streams that contain threatened or endangered trout species and watersheds that provide domestic water supplies.

- Use the following spacing of cross-drains on unsurfaced roads as a guide:

Road Gradient (%)	Spacing (feet)
1-3	1,200
4-6	700
7-9	400
10-14	250
15-20	120

- Outslope unsurfaced roads and trails where user safety and designed use are not jeopardized.

- Avoid creating berms that hinder drainage on low gradient roads.

- Revegetate roads and trails when use is terminated.

- Return all lands in declining watershed condition to equilibrium.

Wild and Scenic Rivers

- Develop management plans in conjunction with the Sequoia National Forest for the newly designated North Fork of the Kern and South Fork of the Kern Wild and Scenic Rivers.

- Undertake no management activities that would preclude designation of the Middle Fork of the San Joaquin River as a Wild and Scenic River.

Wilderness

- Develop management plans or amend existing plans to address wilderness designated by the California Wilderness Act of 1984 or any wilderness legislation enacted during the planning period.

- Manage wilderness under the following guidelines: maintain a predominantly natural and natural-appearing environment, facilitate low frequencies of interaction between users, and exercise necessary controls primarily from outside the wilderness boundary. Any on-site controls should be subtle.

Table 7-2
General Design Criteria

	Hydraulic Feature	Minimum Design Flood, Years	Minimum Freeboard[1]
Bridges	Water Surface Scour[9]	50[2] 500[8]	600 mm; 1000 to1500 mm for wooded debris; 1500 to 3000 mm for ice flows.[3]
Culverts	Water Surface & Scour[9] Service Life	See Table 7-3 N/A	300 mm[4] N/A. 50-year maintenance free materials, coatings, and invert protection.
Erosion Protection (In stream/ Riparian)	Water Surface & Scour[9]	See Table 7-3	300 mm[5]
Retaining Walls[6] < 3000 mm high	Water Surface & Scour[10]	See Table 7-3	300 mm[5]
Retaining Walls[6] • 3000 mm high	Water Surface Scour[10]	50 50 to 500[7]	300 mm[5]
Ditches & Small Channels (Q_{10} < 1.5 m^3/s)	Water Surface & Scour[9]	See Table 7-3 for ADT < 400; 10 for ADT > 400	300 mm or bottom of aggregate base layer
Curb & Gutters and Bridge Decks	Water Surface	5 for ADT < 400; 10 for ADT > 400	N/A. Design speed < 72km/h, allowable spread (AS) = ½ the travel lane width. Design speed • 72 km/h, AS = shoulder + 1.0 m.
Storm Sewers	Water Surface	10 for ADT < 400; 25 for ADT > 400	N/A. Check for 50-year hydraulic grade line (HGL)

Notes:

[1]Flood plain ordinances or other legislative mandates may limit allowable backwater or encroachment on the flood plain. Social considerations including the importance of the facility as an emergency evacuation route or as a National defense access road should be considered. Ecological considerations and geological or geomorphic conditions may also affect freeboard selections.

[2]See FAPG 650A. Check for 100 year flood. Generally, most flood regulations will allow for 300 mm of bridge backwater under 100-year flood conditions.

[3] Freeboard is the vertical distance between the water surface at the design flood and the low point of the bridge beam. Special clearances may also be required for bridges over a navigable body of water.

[4] Freeboard is the vertical distance between the water surface at the design flood and the top of the road surface. Headwater at culvert inlets also should not exceed 2.4 meters. When this occurs, the designer should consult the hydraulics engineer.

[5]Freeboard is the vertical distance between the water surface of the design flood and the top of the subgrade.

[6] For retaining walls located in stream and/or within riparian zones.

[7] As the cost of the retaining wall approaches the cost of a bridge of comparable length, the minimum design flood for scour should approach that for a bridge.

[8] When the 500-year flood is unknown, use 1.7 times the 100-year flood.

[9]For scour at bridges and culverts, in stream and riparian zones, and ditches & small channels, we should use the procedures outlined in the following FHWA publications:

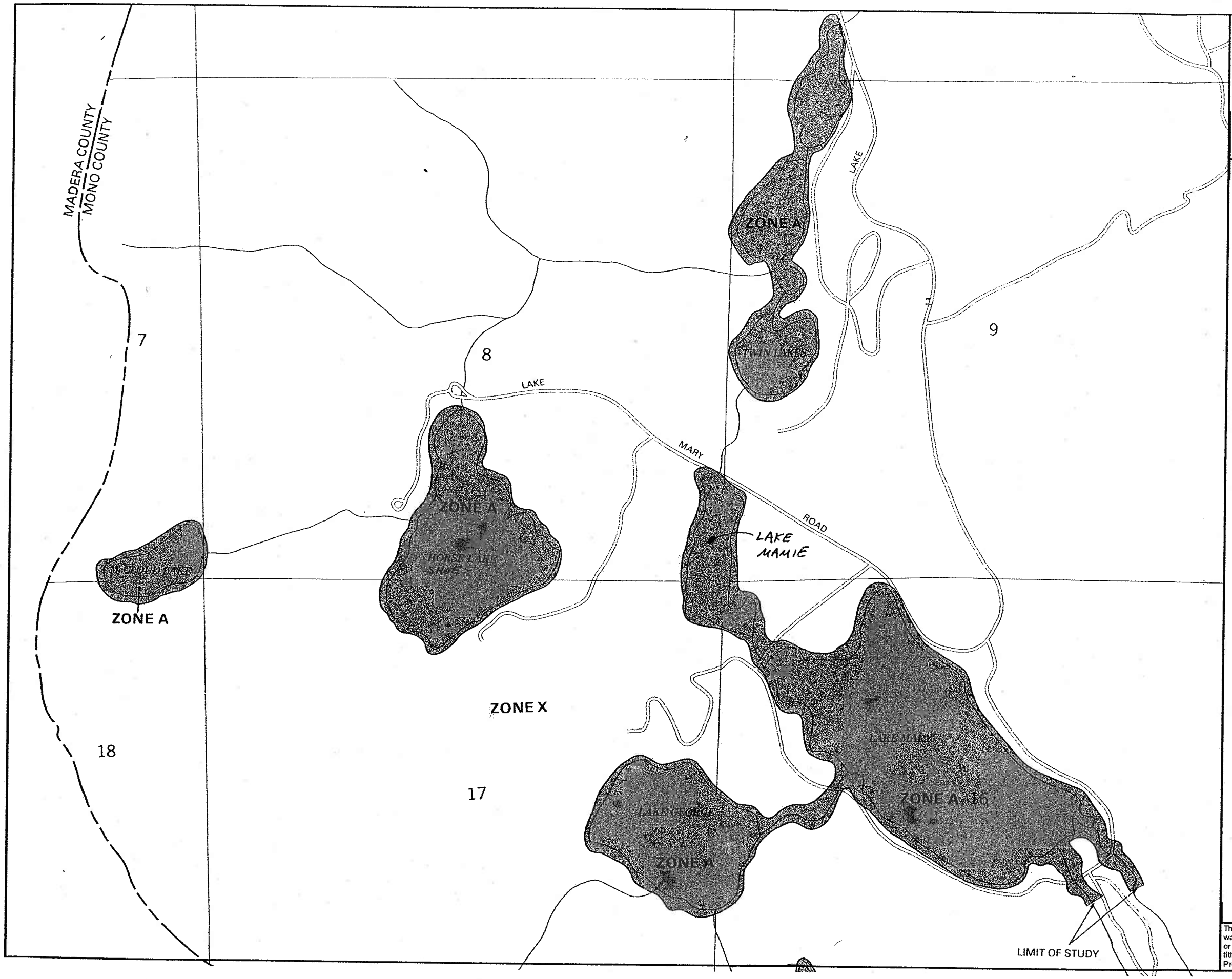
a. Bridge scour - HEC-18,"Evaluating Scour at Bridges, Edition 3(SI)", dated 1995.
b. Culvert scour - HEC-14, "Hydraulic Design of Energy Dissipaters for Culverts & Channels", dated 1983.
c. In stream/Riparian erosion protection & scour - "Highways in the River Environment", dated 1990, and HEC-11, "Design of Riprap Revetment", dated 1989.
d. Ditches & Small Channels - HEC-15, "Design of Roadside Channels with Flexible Linings", dated 1988.

In addition to the FHWA publications, several other agencies (USACE, WDFW, etc.) have published acceptable references for scour protection, riprap design, bioengineering techniques, and barb/bendway designs.

[10]Wall foundations should sit on bedrock or deep foundations to prevent undermining. If this is not feasible, then the foundation should have a protective riprap revetment or comparable with a minimum factor of safety of 1.0 for the minimum design flood. In certain circumstances, scour protection may be waived. These circumstances include such situations as favorable stream morphology and natural vegetation conditions and favorable economic risks(i.e., inexpensive wall with only a small chance of scour).

Table 7-3
Average Daily Traffic(ADT) vs. Minimum Design Flood

Projected ADT	Minimum Design Flood, Years
0 to 10	2
11 to 49	5
50 to 399	10
400 to 1499	25
1500 and up	50



N

APPROXIMATE SCALE IN FEET

1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

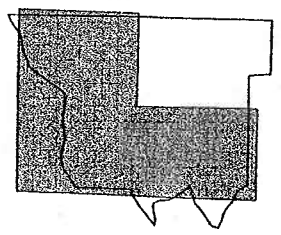
FIRM

FLOOD INSURANCE RATE MAP

TOWN OF
MAMMOTH LAKES,
CALIFORNIA
MONO COUNTY

PANEL 5 OF 5

(SEE MAP INDEX FOR PANELS NOT PRINTED)

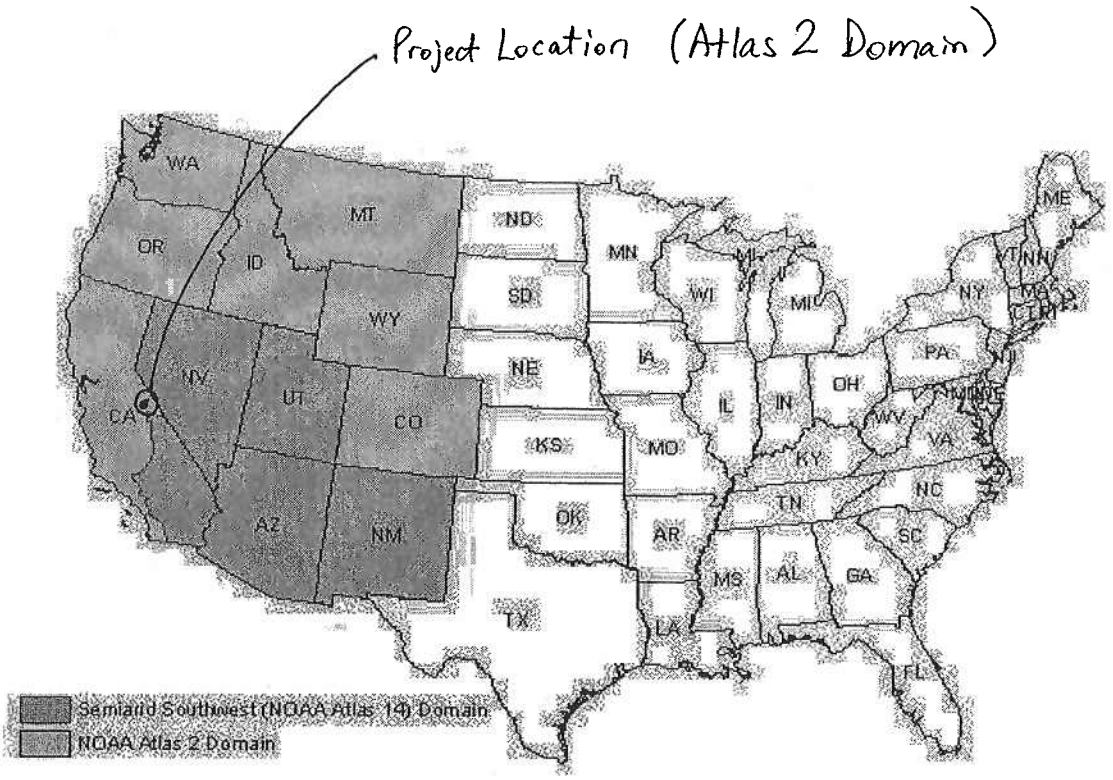


PANEL LOCATION

COMMUNITY-PANEL NUMBER
060724 0005 B

MAP REVISED:
SEPTEMBER 30, 1992

Federal Emergency Management Agency


Project Location (Atlas 2 Domain)
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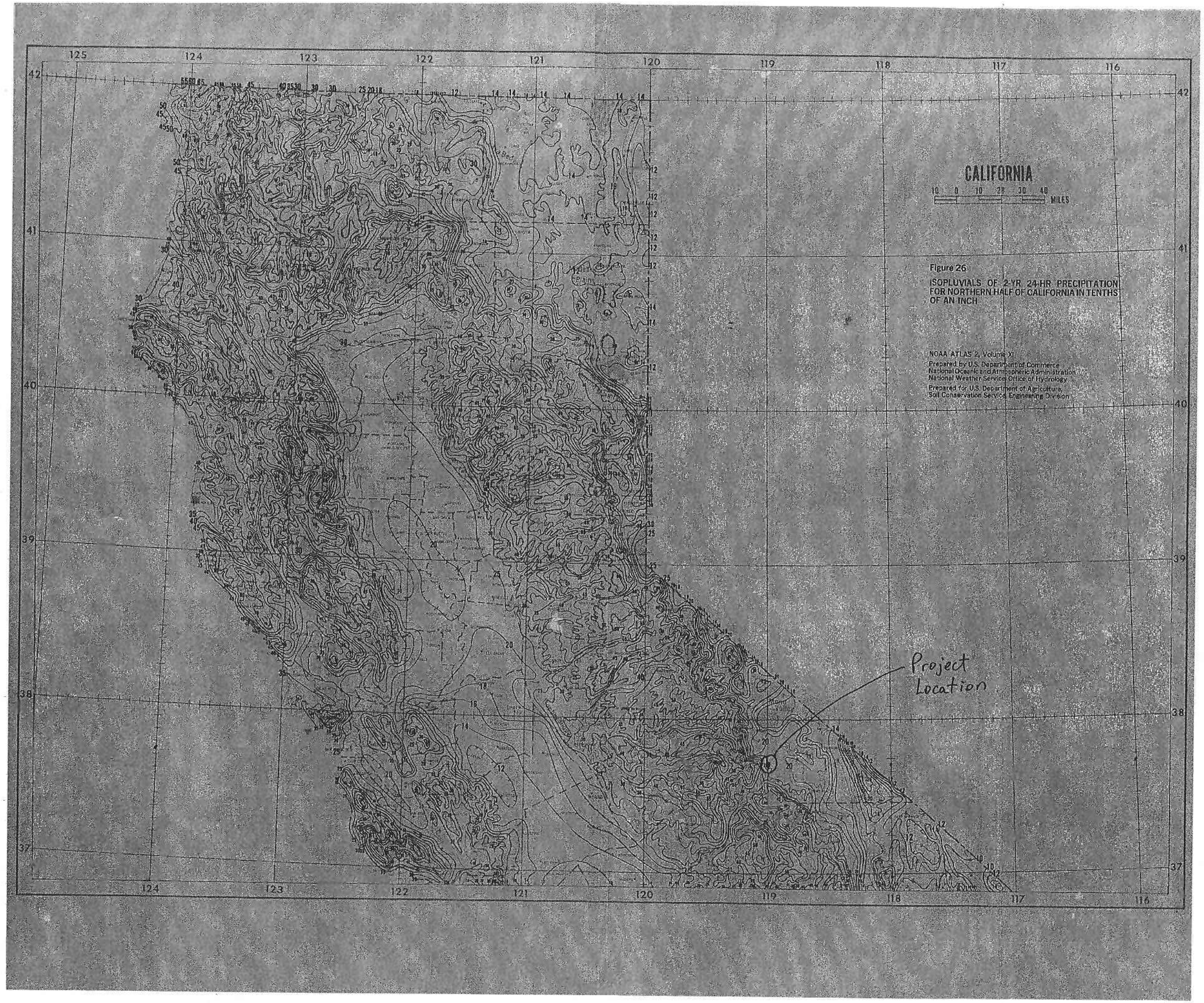
Semiarid Southwest (NOAA Atlas 14) Domain
NOAA Atlas 2 Domain


CALIFORNIA
10 0 10 20 30 40 MILES
Figure 26
ISOPLUVIALS OF 2-YR 24-HR PRECIPITATION FOR NORTHERN HALF OF CALIFORNIA IN TENTHS OF AN INCH
NOAA ATLAS 2, Volume XI
Prepared by U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Department of Agriculture
Soil Conservation Service, Engineering Division
Project Location
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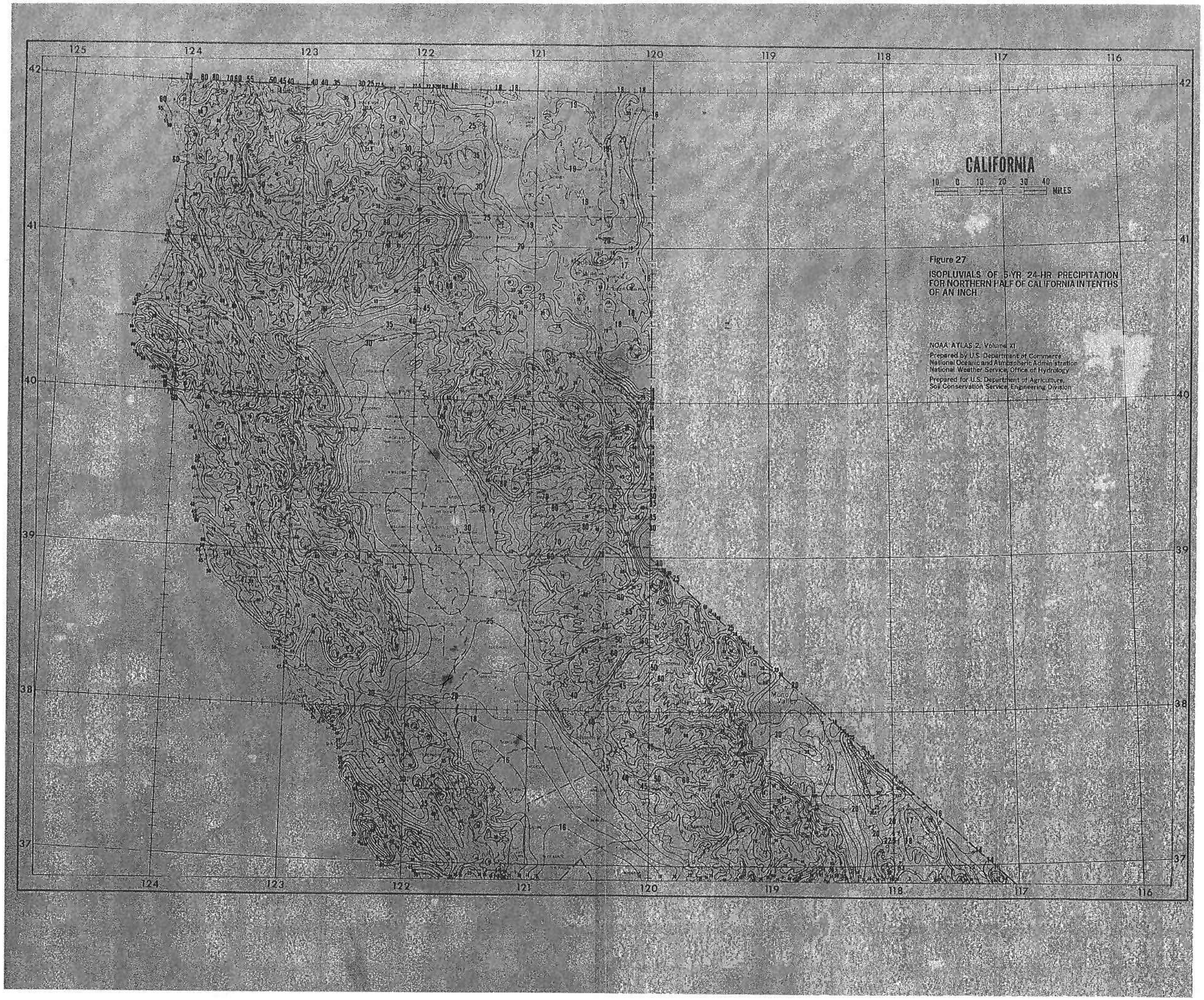
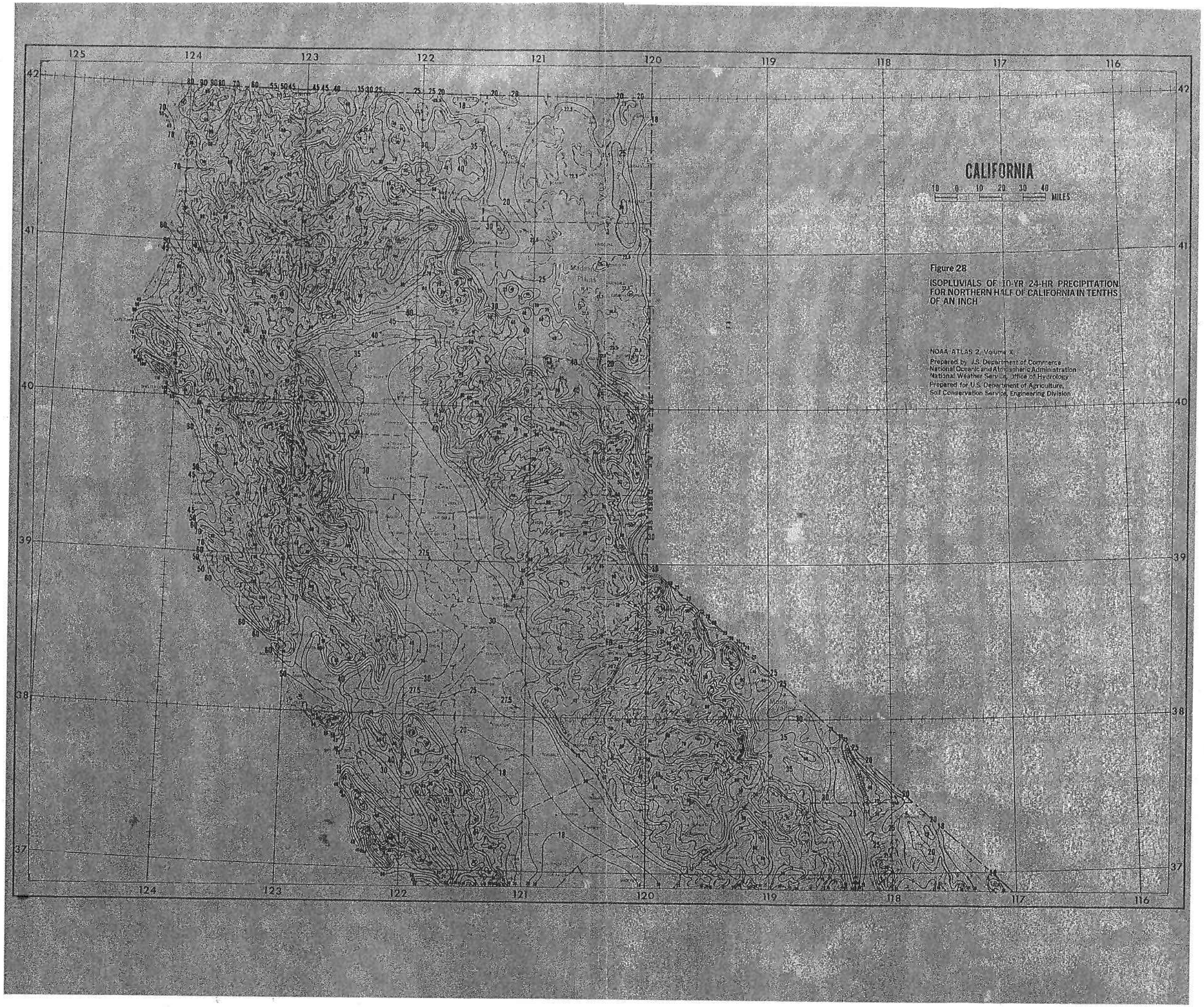
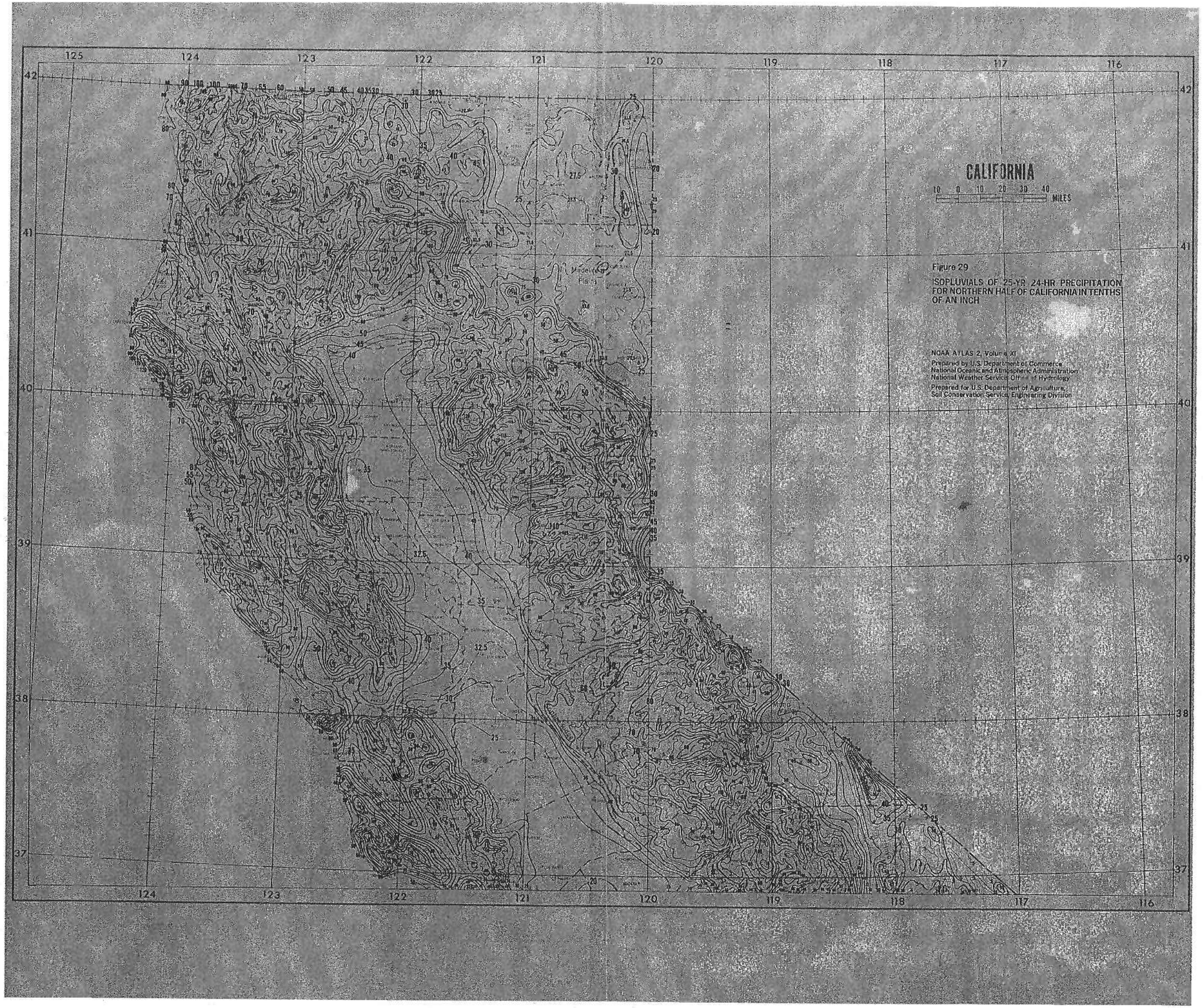


Figure 27

ISOPLUVIALS OF 5-YR 24-HR PRECIPITATION FOR NORTHERN HALF OF CALIFORNIA IN TENTHS OF AN INCH


CALIFORNIA
10 0 10 20 30 40
MILES
Figure 28
ISOPLUVIALS OF 10-YR 24-HR PRECIPITATION FOR NORTHERN HALF OF CALIFORNIA IN TENTHS OF AN INCH
NOAA ATLAS 2, Volume X
Prepared by U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Department of Agriculture,
Soil Conservation Service, Engineering Division


CALIFORNIA
10 0 10 20 30 40
MILES
Figure 29
ISOPLUVIALS OF 25-YR 24-HR PRECIPITATION FOR NORTHERN HALF OF CALIFORNIA IN TENTHS OF AN INCH
NOAA ATLAS 2, Volume XI
Prepared by U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Department of Agriculture
Soil Conservation Service, Engineering Division
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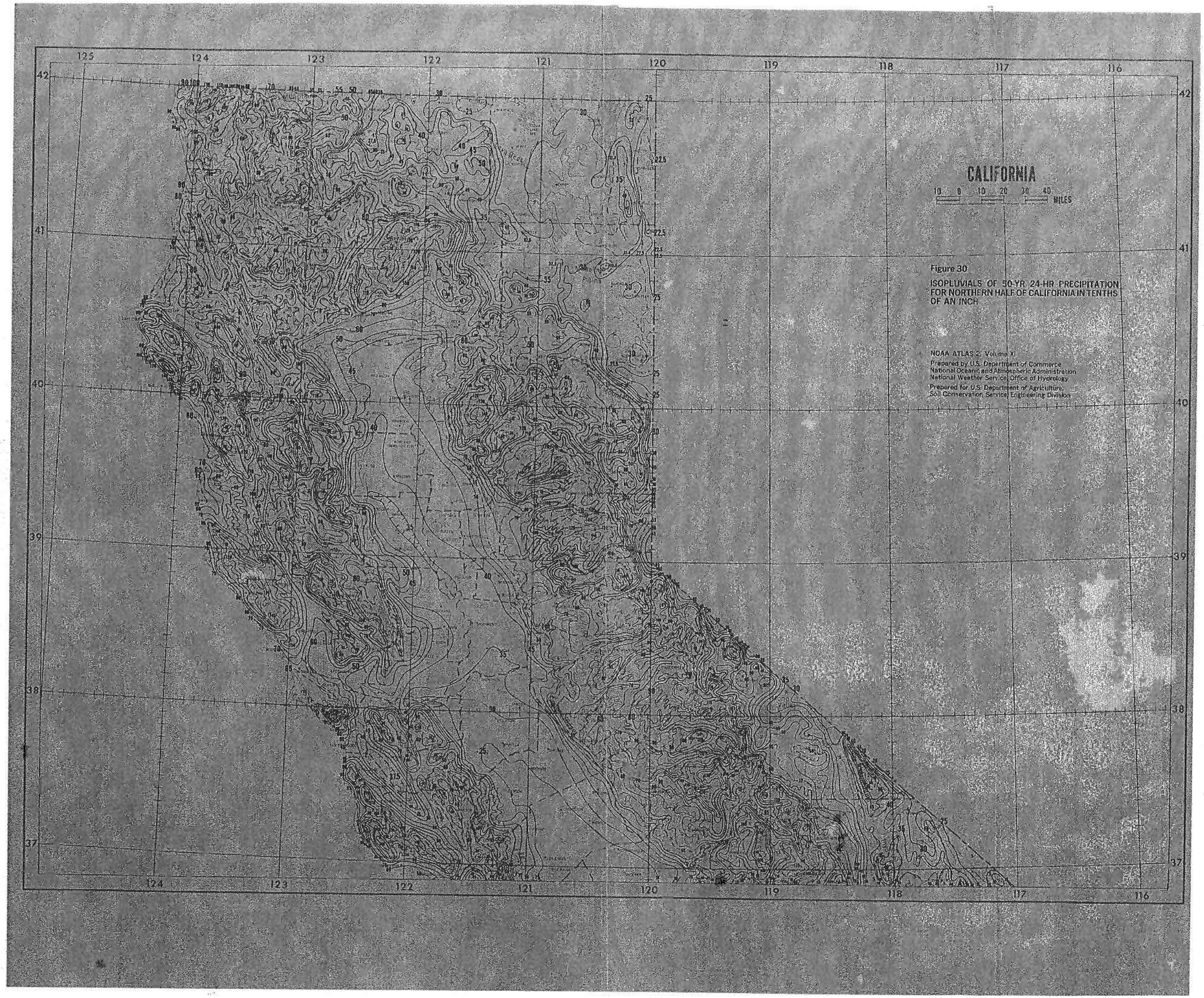
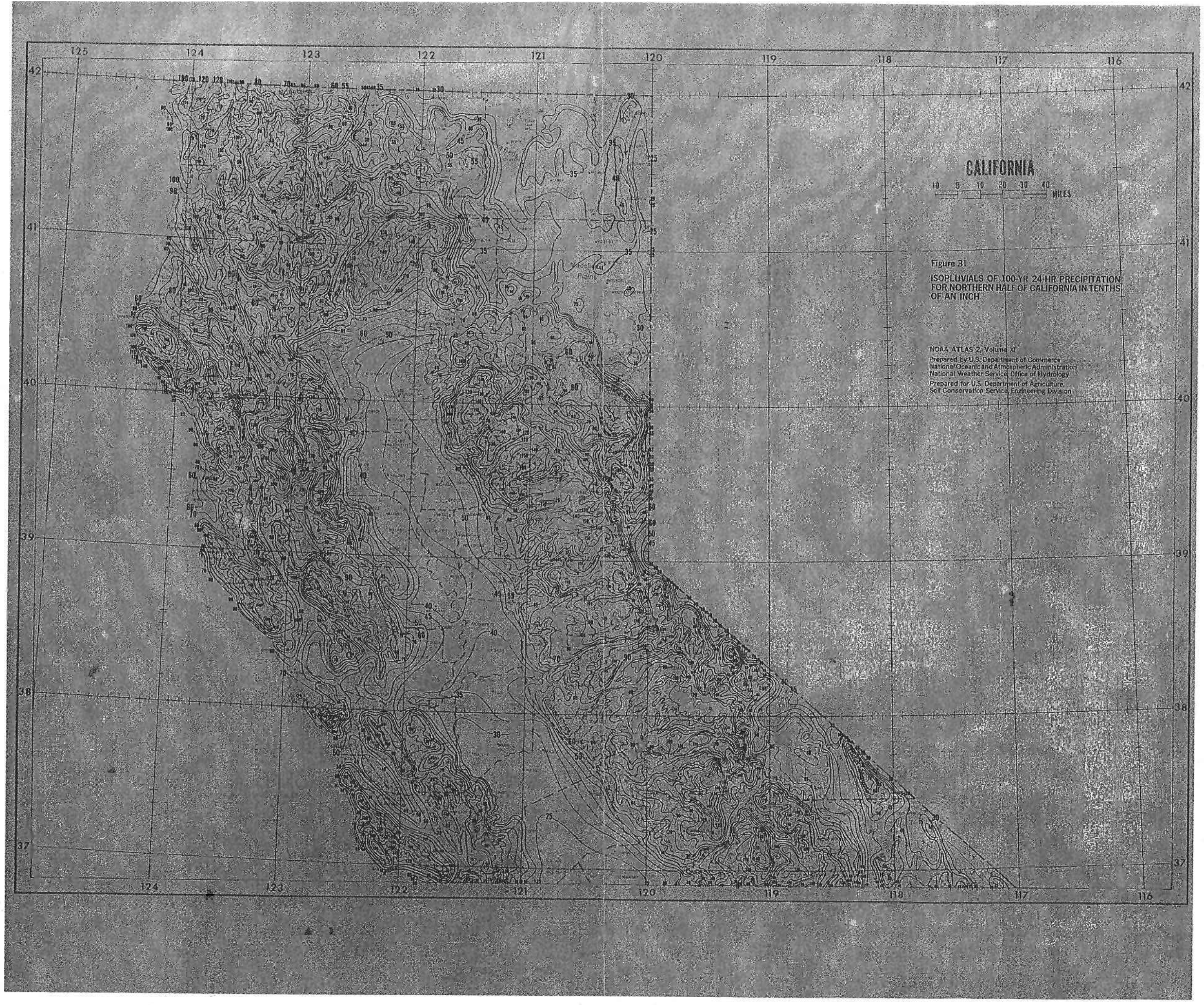

CALIFORNIA
10 0 10 20 30 40 MILES
Figure 30
ISOPLUVIALS OF 30-YR 24-HR PRECIPITATION FOR NORTHERN HALF OF CALIFORNIA IN TENTHS OF AN INCH
NOAA ATLAS 2, Volume XI
Prepared by U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Department of Agriculture
Soil Conservation Service, Engineering Division


CALIFORNIA
10 0 10 20 30 40 MILES
Figure 31
ISOPLUVIALS OF 100-YR 24-HR PRECIPITATION FOR NORTHERN HALF OF CALIFORNIA IN TENTHS OF AN INCH
NOAA ATLAS 2, Volume XI
Prepared by U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service, Office of Hydrology
Prepared for U.S. Department of Agriculture
Soil Conservation Service, Engineering Division

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

INSPECTION REPORT

REGION NO. 5	**REPORT ON:** Lake Mary Road, Inyo National Forest Scoping Review	**DIVISION:** CFLHD
DATE OF INSPECTION: August 19, 2003	**INSPECTION MADE BY:** See Below	**PROJECT NO.:** CA PFH 81-1(1)
IN COMPANY WITH: See Below		

On Tuesday, August 19, 2003, a review meeting was held at the Town of Mammoth Lakes offices in Mammoth Lakes, California. It was immediately followed by a detailed walk-through of the proposed project. The following personnel were in attendance (See Attachment A):

Federal Highway Administration (FHWA), Central Federal Lands Highway Division (CFLHD)
Jennifer Corwin, Environmental Specialist
Chris Longley, Highway Design Engineer
Rick West, Project Manager

U.S. Forest Service (USFS)
Bill Fodge, Transportation Engineer, Region 5 (Vallejo)
Allen Tobey, Forest Engineer, Inyo National Forest (Bishop)
Melissa Totheroh, Civil Engineer, Inyo National Forest (Bishop)

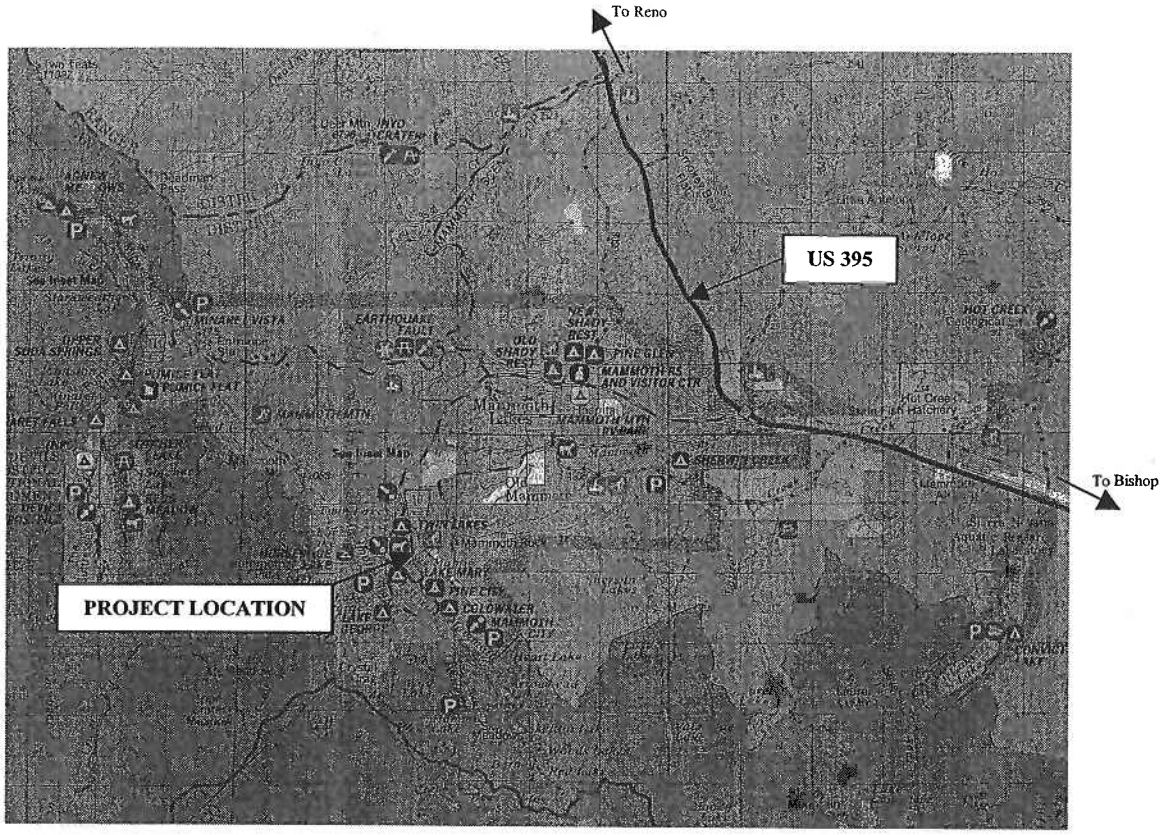
Town of Mammoth Lakes
Steve Black, Director of Public Works
Peter Bernasconi, Associate Civil Engineer

Carter & Burgess (C & B)
Jeff Wilson, Project Manager
Jeanette Lostracco, Environmental Manager

BACKGROUND

The Central Federal Lands Highway Division (CFLHD) of the Federal Highway Administration (FHWA), in cooperation with Inyo National Forest (INF), and the Town of Mammoth Lakes (Town) is proposing to improve the pavement and drainage conditions for Lake Mary Road in the INF. The project consists of the rehabilitation, restoration, and resurfacing (3R) of 2.8 miles of this route between the Horseshoe Lake Parking Area and the Twin Lakes Loop Road (04S22)

in Mammoth Lakes, California (see map below). Mammoth Lakes is located on SR 203, approximately 168 miles south of Reno, Nevada along US 395.



PROJECT LOCATION MAP

The existing roadway is paved to a 22-foot width with variable width gravel shoulders. The proposed section is planned to be 26 feet wide with (2) 11 foot paved lanes and 2 foot paved shoulders. Construction of the project is currently scheduled to begin in 2006.

In April of 2001, the INF prepared a Public Forest Service Road Project Summary to determine the project justification and budget. In addition, the FHWA conducted a Reconnaissance Investigation of the route on September 23 and 24, 2002. A draft Reconnaissance and Scoping Report dated January 15, 2003 was prepared as a result of this effort and documents the need for rehabilitation work on Lake Mary Road. This report has not been finalized.

OFFICE REVIEW

The following items were distributed at the meeting:

- Agenda (see Attachment B)

- List of Environmental Documents Prepared for the Lake Mary Road Bike Path project, August 2003.
- Public Lands Highway Program (Forest Highway) A Chronologic History-FHWA-CFL, April 7, 1994.
- 90%(±) plans for the Town bikepath project (11x17), July 2003.
- Roadway plan and profile drawings, circa 1935, by Caltrans.
- Typical section graphic.
- Color 11x17 topographic map of Lake Mary Road w/ GPS data shown.

Update of Bikepath Project

The Town of Mammoth Lakes is currently developing a bikeway project that affects three locations of the planned Lake Mary Road project. The Town has completed the Environmental Assessment for their project and they are approximately at a 90% complete level of design. At the office meeting Mr. Bernasconi provided a set of hard copy plans dated July 2003. Mr. Bernsconi will provide an electronic version at a later date. The current understanding is that those sections of Lake Mary Road that are affected by the Town project will be constructed by the Town (i.e., excluded from the FHWA project).

Construction timing for the bikepath project would occur from mid-June to mid-October. There will be no construction on long holiday weekends.

Schedule and Budget

The Lake Mary Road project is currently planned for advertisement in 2005 and construction is scheduled for 2006. The road project will likely be a 2 season project, due to weather limitations. This schedule depends on the completion of the construction of the Town's bikepath project, currently planned for 2004-2005 construction. Because the bikepath project affects three portions of Lake Mary Road, it was determined that the bikepath project should be completed first so that the FHWA can match design at these three locations. Funding for the bikepath project is now a concern due to the State of California budget problems. Although not anticipated, the bikepath project could be delayed for some time (possibly until 2008), if the California Transportation Commission does not allocate funds in January 2004. This could delay the FHWA's Lake Mary Road project indefinitely.

Social, Economic, and Environment (SEE) Team

Ms. Corwin explained the composition and purpose of the SEE Team. The SEE Team is typically composed of representatives from the FHWA, applicable land management agency and highway agency. The SEE Team guides project development activities and reviews and advises on the environmental document. It was determined that the following individuals would constitute the SEE Team:

Town of Mammoth Lakes.....Mark Jackson
Forest Service.....Allen Tobey
FHWA/CFLHD.....Rick West
Jennifer Corwin

Carter & Burgess.....Jeff Wilson
Jeanette Lostracco

Project Scope

The logical termini for the project were determined to be the Horseshoe Lake Parking Area (start) and south abutment of the Twin Lakes bridge (end). Since the Town's funding for the bikepath project is not finalized, the FHWA may include the three realignment areas needed where the bikepath would converge with the roadway in its project. As a result, the FHWA will include these three realignment areas in its environmental evaluation. Improvements in these cases will be limited to the roadway only (no bikepath). If the Town's funding is obligated by the CTC in the January 2004 meeting, these roadway sections will be deleted from the FHWA's design though they will continue to be included in the environmental evaluation.

The Town indicated that it ultimately would like to add bus pullouts and transit capacity in the attempt to reduce use of individual automobiles and traffic within the INF.. Currently this is beyond the scope of the proposed 3R project, however, the FHWA could at least identify potential locations for the pullouts and ensure that the proposed 3R project will not preclude the Town or INF from installing these pullouts in a future project.

The INF had indicated that the Red Dog Mine may be developed near Lake Mary Road and that the Lake Mary may be used for hauling purposes. As a result, the structural section might need to be thicker to withstand the impacts of having large trucks using the road to haul material. It was decided that it was not necessary to include this element within the scope of the proposed 3R project premature given that the Bureau of Land Management permits mining activities. The issue of needed road improvements for the mining project would be addressed in the BLM's environmental document prepared for the issuance of the permit.

The INF indicated that they are considering the possibility of making the two-way road around Lake Mary (different from the road being proposed for 3R work) a one-way road. The proposed 3R work on Lake Mary Road would facilitate this action.

Environmental

Purpose and Need

Ms. Corwin explained that critical to the preparation of the environmental document is having a comprehensive and well-supported account of the purpose and need for the project. The meeting participants agreed that the purpose and need statement for the project should include the following problems:

- The pavement is in poor pavement condition and requires rehabilitation.
- Raveling is occurring where curve widening is not provided
- Maintenance of the road continues to increase in both labor and cost due to the por condition of the pavement and the substandard design.
- There are spot areas that have poor sight distance

- The mix of traffic types (RV, automobile, bicycle, equestrian, pedestrian) require additional section width. Currently all share the traffic lanes.
- The road needs to accommodate project recreational use of the area.

Ms. Corwin asked where the FHWA might identify support for these points of concern. The meeting participants suggested investigating the following sources:

- California Highway Patrol Accident Data to be provided by the Town (See Mr. Jackson)
- National Recreational Use Monitoring data to be provided by Ms. Totheroh of the INF
- Campground use data for the Lakes Basin to be provided by Ms. Totheroh of the INF
- The updated Forest Plan to be provided by Ms. Totheroh of the INF
- The Town Land Use Plan to be provided by the Town
- Socioeconomic data to be acquired by Ms. Lostracco from the Town's Visitor's Bureau

NEPA Clearance

At the time of the meeting, the level of environmental review for the proposed 3R project was undetermined. An Environmental Assessment (EA) was prepared for the Town's bikepath project resulting in a Finding of No Significant Impact (FONSI). The level of environmental review needed depends on the results of project scoping. Project scoping includes conducting meetings with the public and environmental agencies and performing environmental surveys of the project area. It was noted that issues that could affect the decision regarding the level of environmental review include socio-economic impacts experienced by local businesses (use of the area during the summer months, potential road closures and subsequent business impacts, disruptions during construction, etc.).

Environmental Issues

Ms. Lostracco distributed a list of environmental documents covering the project area that she has reviewed. Ms. Lostracco identified the following additional documents that she still needs to acquire that might provide some information regarding the project area:

- Sierra Nevada Forest Plan Amendment (To be provided by Ms. Totheroh)
- 1994 Mono County Regional Transportation Plan updated in 2000 (To be provided by Mr. Jackson)
- Mammoth Lakes Storm Drainage Master Plan (To be completed in the next three months and provided by Mr. Jackson)
- Lahontan Regional Management Plan (To be provided by Mr. Jackson)
- Memorandum of Understanding between the Town of Mammoth Lakes and the Regional Quality Board (To be provided by Mr. Jackson)
- Mono County Ozone Attainment Plan (Mono County)

A wetland delineation for the bikepath EA only evaluated areas where the bikepath impacted wetlands. Therefore, a complete corridor evaluation will be required. At this time, a final wetland report is not yet available for the bikepath project. Bill Taylor is the Town's contact person regarding questions on their wetland delineation report.

Historical Resources – It was suggested that the SHPO be contacted frequently to ensure they receive everything that is transmitted.

Visual Impacts – A packet of information on visual analysis was provided by the Forest Service which included both hard copy and a compact disk.

California Environmental Quality Act (CEQA) Compliance – TBD. This may not be required for this project, but will be confirmed by FHWA. FHWA will hold CEQA training for November/December in Denver. The training is open to all agencies.

FHWA may be exempted from Fish and Game restrictions. This will be confirmed by FHWA.

Native American Consultation – TBD by discussions with the SHPO.

Cumulative Impacts – Only those projects with definite funding should be considered as reasonably foreseeable actions to be considered in cumulative impact analysis. Ms. Corwin indicated that the following actions need to be considered in the cumulative impact analysis:

- Capital improvement for Mammoth Lakes
- Gold Mine
- Pack Station has plans for remodeling
- New trail bridge at Twin Lakes
- Lakes Basin Transportation Committee is addressing parking and transportation/ transit issues. No decisions are made yet. May add/eliminate parking.

The following is a potential list of sources for reasonably foreseeable projects:

- Regional Transportation Plan
- Capital Improvement Plan – Town of Mammoth Lakes. (To be obtained from Mr. Jackson)
- General plan – Town of Mammoth Lakes (document in development).
- Economic Development Plan – Town of Mammoth Lakes (document complete late 2003).
- New Trail Bridge at Twin Lakes – Forest Service.
- Alternate Transportation Systems Study – Forest Service. Cambridge Systematics is beginning a study to look at transportation system improvements in the Forest. The contact person is Sandy Hogan, Mammoth Ranger District.
- Lakes Basin Transportation Committee is addressing parking and transportation/ transit issues. No decisions are made yet regarding the addition or elimination of roadside parking.
- Red Dog Mine – Red Dog resources, Inc. (Old Mammoth Mine reactivation– gold). Last activity was in 2000.

- Pack Station Improvements – Mammoth Lakes Pack Outfit. Through an agreement with the FS, the station has a draft plan for site improvements on both sides of Lake Mary Road. (To be obtained from Ms. Totheroh.)

Public Meetings
All meetings should be held in the evenings, in the middle of the week (Tue.-Thu.) at the Town Community Center. Alternate Wednesdays are council meetings (first and third of the month) and should therefore be avoided. However, presentations can be made to Council at their Wednesday meetings.Public access TV is available on channel 51. Advertisements/Notices should be run in the Inyo Register and Mammoth Times. In addition, other suggestions for notification are:

- Put construction signs out in the project area notifying the public of upcoming meetings.
- List of property owner/lessees from town.
- Notices at campgrounds and at the Mammoth Visitor Center.
- Web site links to Forest Service and Town websites.
- Note on Reservations for campgrounds.

Agency Meetings
Agencies should be met with in a one-on-one format versus a group format. The interagency and SEE team meetings will like be held in the spring of 2004. Since weather will restrict the ability to view the site, a digital video of the corridor should be acquired for reference at the meeting. The Regional Water Quality Board and Fish and Game should be included as part of the Interagency Team.

Mailing List – The project mailing list should be developed from the list maintained by the Lakes Basin Transportation Committee, Chamber of Commerce (if applicable), agency and contact list (Forest Service). These lists are to be provided by Mr. Tobey and Mr. Jackson.

Final Environmental Document – It was noted that the final environmental document will be an FHWA document, signed by the Division Engineer.

Survey and Right of Way (ROW)
The highway was originally owned by Caltrans as part of the old SR 203. The alignment as it exists today was designed circa 1935 and plans of that design alignment were provided by the Town. In those plans, there were sections with a fixed ROW corridor as follows:

132 feet (66'L + 66'R).....Lake Mamie to Lake Mary
150 feet (50'L + 100'R).....Lake Mary
100 feet (50'L + 50'R).....Lake Mary Loop Intersection
132 feet (66'L + 66'R).....Lake Mary Loop to Pack Station

This ROW was relinquished by Caltrans to Mono County in December of 1967 and was subsequently relinquished to the Forest Service 1986. Currently, the road is on INF lands under a

Road Use Permit to the Town. At this time, there is apparently no DOT easement in place.However this needs to be verified. Ms. Totheroh will contact Mr. Ralph Cones of Caltrans District 9 in Bishop and/or Ms. Nancy Escalier of the ROW Department to verify that there is no DOT easement in place.

With the exception of snow plowing and avalanche control, the Forest Service is the maintainer of the roadway within the project limits. Ownership is all U.S. Forest with the exception of the Pokonobe Resort. The other businesses on the corridor are on Special Use permits with the Forest Service.

Because there is an existing 200-foot easement, the INF owns and maintains the road, and the proposed project is to occur within the existing road prism., no letter of consent from the INF is needed.

Should the scope of the project change requiring purchase of ROW a letter of consent from the INF will be required and the Town will be able to coordinate the purchase of ROW from the private landowner.

The FHWA shall be provided a list of all utilities with easements within the current road ROW (see below). Mr. Bernasconi will provide records of survey for the platted subdivision located near the road and Pokonobe Lodge.

Survey – North American Mapping prepared the base model for the bikepath project. They sent the Digital Elevation Model (DEM) from that work to FHWA but more information is required. The Digital Terrain Model (DTM) created from the DEM will be required for the design. In addition, the CADD files for the bikepath project (AutoCAD based) are also required to ensure accurate merging of the two design projects. This information will be requested by the Town from North American Mapping and Triad/Holmes and Associates and provided to FHWA.

Maintenance

As discussed above, the INF has responsibility for roadway surface, shoulder and drainage maintenance on Lake Mary Road. The roadway wearing surface has deteriorated significantly and edge raveling is a problem where curve widening does not exist. Surface maintenance has become a constant activity for FS staff and crack sealing is now required annually on the road.

Snow plowing is performed by the Town and only during the early winter season (September-October) for access and late winter/spring season (May 1st) for cross-country skiing. The roadway is closed and gated off, usually around November 1st and is not opened until late May to mid-June, and in heavy snow years, early July.

Traffic

Mammoth Lakes desires to ultimately add bus pullouts and transit capacity to minimize the impacts of automobile traffic. Initially, the roadway project can help identify potential locations

for such improvements (not preclude their future installation) but this is outside the scope of the current roadway project.

7-day traffic counts were gathered in late August 1999 by RJKJ for the Town of Mammoth Lakes. Lake Mary Road traffic counts were recorded as follows:

Location	Weekday Average	Saturday	7-day Avg. ADT
N. of Twin Lakes Loop Road	2713	4285	3053
S. of Lake Mary Loop Road	1053	1802	1220

It was noted in the report that the Saturday counts represent the highest traffic of the week, followed by Friday, then Sunday. Volumes for Monday through Thursday are lower as expected.

Accident information has not yet been received but is available from the Town. There are not many significant problem areas but a few were discussed during early scoping activities.

Additional use data can be obtained from a National Recreational Use Monitoring (NRUM) report completed by the Forest Service as well as campground use data directly from the Inyo Forest.

Design and Safety

Initially, the following design objectives have been identified:

- Improve the wearing surface through pavement rehabilitation and minor reconstruction.
- Improve the typical section through the paving of the gravel shoulders (2 feet each side).
- Improve safety by creating more uniform foreslope areas.
- Improve safety and pavement durability by adding curve widening.
- Evaluate and improve intersection sight distances.
- Improve roadside drainage where possible and evaluate culvert conditions.
- Evaluate and improve pedestrian/equestrian crossing locations.
- Evaluate and improve existing guardrail installations.

Additional bench width in areas of high fills will be achieved by lowering the profile.
The Town offered the following design preferences for the project:

- Use stacked rock retaining walls versus keystone walls.
- For retaining walls, the smaller the better.
- Limit guardrail to preserve scenic quality.
- Consider a crown shift over on uphill sections for bikes, allowing additional width for them to move slowly (road bikers will still use the road even with a bike path).
- Limit clearing of obstructions (timber) to only what is necessary.

The Town is planning to use on the bikepath project some of the cut trees as a barrier between the bike lane and roadway to prevent parking in the bike lane. In some areas they may use rocks as well. At the 30% field review, areas will be looked at where this type of treatment can be incorporated.

Design Plans – The INF and the Town will have continual review and input throughout the project development process. Each will need to approve the PS&E plans by letter, but no title sheet signatures will be required.

Utilities

Lowering of the roadway bench, as discussed above, could adversely affect the utilities in the roadway. To aid in identification of any potential conflict areas, an early utility coordination meeting should be scheduled around October 2003 to review as-builts and site conditions. A later meeting would likely have problems due to weather.

The following utility contacts were provided by the Town:

Power	Southern California Edison P.O. Box 7329 Mammoth Lakes, CA 93456	Bob Ziglar (760) 934-8236 (760) 447-3257 cell
Telephone.....	GTE/Verizon 350 Logan Street Bishop, CA 93514	Don Nelson or Margaret Hall (760) 872-0855
Cable TV	Cablevision Mammoth Lakes, CA 93456	Ron Nelson (760) 934-8553
Water & Sewer.....	Mammoth Community Water District Mammoth Lakes, CA 93456	John Pederson (760) 934-2596
Gas	Rock Creek Energy 26000 Commercecentre Drive Lake Forest, CA 92630	Ken Teague (949) 454-7105

Construction

The construction season at the site is limited due to snowfall. The season above Twin Lakes begins at the end of June and runs through September, with occasional work possible in October. Complete road closure is possible after Labor Day. Short-term (off-peak hour) closures can be allowed, as long as they avoid 3-day weekends and holidays.

Detours – A potential detour route that has been used in the past is Old Mammoth Road. This road has a narrow cross section (1+ lane wide), steep grades, tight curves that will not

accommodate RV's and trailers and only provides for a closure through the Twin Lakes Loop section. However, it was used successfully during the Twin Lakes bridge replacement project.

Another potential detour route is Lake Mary Loop Road. This road can accommodate bi-directional traffic, but has narrow lanes, restricted sight distance and frequent camping/boating access and roadside activity. This roadway has been considered by the INF for future conversion to one-way traffic.

Staging Areas – Several areas for consideration as a staging area are available. Suggested sites are: (1) at the Pack Station; (2) near the Visitor Center at the 'old boneyard'; (3) at the Water District's old filtration plant; (4) and at Camp High Sierra. Water and power are required at the staging area so some areas may not work as well as others.

One other such area that may work very well is the borrow pit near the Horseshoe Lake Loop. This is a small borrow pit used by the Forest Service and is conveniently located on the project corridor. Disturbance to vegetation would be minimal due to the presence of carbon dioxide gas in the area and low vegetative cover. However, fencing (protective and silt) and other means for protecting adjacent land will be required and water service to the site will have to be resolved.

Action Items

1. **For future correspondence to the SEE Team, send meeting notices via E-mail and follow with a hard copy.**
2. **Mr. Bernsconi will provide the FHWA an electronic version of the Lake Mary bikepath 90% design plans. The plans should be in AutoCAD format.**
3. **Mr. Jackson will provide the FHWA California Highway Patrol Data regarding frequency and location of accidents on Lake Mary Road.**
4. **Ms. Totheroh will provide the FHWA National Recreational Use Monitoring.**
5. **Ms. Totheroh will provide the FHWA Campground use data for the Lakes Basin area.**
6. **Ms. Totheroh will provide the FHWA an updated Forest Plan.**
7. **Mr. Jackson will provide the FHWA The Town Land Use Plan.**
8. **Ms. Lostracco will gather socio-economic data from the Town's Visitor's Bureau.**
9. **Ms. Totheroh will provide the FHWA the Sierra Nevada Forest Plan Amendment.**
10. **Mr. Jackson will provide the FHWA the 1994 Mono County Regional Transportation Plan updated in 2000.**
11. **Mr. Jackson will provide the FHWA the Mammoth Lakes Storm Drainage Master Plan.**
12. **Mr. Jackson will provide the FHWA the Lahontan Regional Management Plan.**

13. **Mr. Jackson will provide the FHWA the Memorandum of Understanding between the Town of Mammoth Lakes and the Regional Quality Board.**
14. **Ms. Lostracco will collect the Mono County Ozone Attainment Plan.**
15. **Ms. Lostracco will contact Mr. Taylor of the Town in order to obtain a final wetland delineation performed for the bikepath project.**
16. **The FHWA will determine whether coordination with the State of California's Department Fish and Game is covered under a Memorandum of Agreement.** *(Since the 8/19/03 meeting, the FHWA consulted with its legal counsel and has determined that there is no MOA that covers FHWA consultation with the California Department of Fish and Game.)*
17. **Ms. Lostracco will obtain a copy of the Regional Transportation Plan.**
18. **Mr. Jackson will provide the FHWA a copy of the Capital Improvement Plan for the Town of Mammoth Lakes.**
19. **General plan – Town of Mammoth Lakes (document in development). Once the document is complete, Mr. Jackson will provide the FHWA a copy of the document.**
20. **Economic Development Plan – Town of Mammoth Lakes (document complete late 2003). Once the document is complete, Mr. Jackson will provide the FHWA a copy of the document.**
21. **Ms. Totheroh will provide the FHWA any information regarding the New Trail Bridge at Twin Lakes.**
22. **Ms. Lostracco will contact Ms. Sandy Hogan at the Mammoth Ranger District to obtain the Alternate Transportation Systems Study being developed by Cambridge Systematics for the Forest.**
23. **Ms. Totheroh will provide the FHWA information regarding improvements at the Pack Station for the Mammoth Lakes Pack Outfit. Through an agreement with the FS, the station has a draft plan for site improvements on both sides of Lake Mary Road.**
24. **Ms. Totheroh will provide the FHWA any mailing lists appropriate for the proposed project. The lists should contain, at the very least, names of owners and lessees within the project area.**
25. **Mr. Jackson will provide the FHWA the mailing lists for the Lake Mary bikepath project as well as the mailing list from the Lakes Basin Transportation Committee.**
26. **Ms. Totheroh will contact Mr. Ralph Cones of Caltrans District 9 in Bishop and/or Ms. Nancy Escalier of the ROW Department to verify that there is no DOT easement in place.**
27. **Mr. Bernasconi will provide records of survey for the platted subdivision located near the road and Pokonobe Lodge.**
28. **Mr. Jackson will coordinate the acquisition of the DTM prepared by North American Mapping for the bikepath project by the FHWA.**

29. C&B will prepare a Draft Project Agreement between FHWA and Mammoth Lakes for review by the FHWA.

30. C&B will arrange for an early utility coordination meeting in October of 2003.

31. **C&B will provide the FHWA copies of the bikepath plans.**

FIELD REVIEW

The following notes were added at the field review of the project site:

1. The staging areas near Horseshoe Lake should provide room for a few horse trailers. Even during construction there will be a need to provide public access.
2. Design should consider steeper foreslopes and a formal ditch as a means to limit roadside parking.
3. The designated equestrian crossings along Lake Mary Road mostly originate from the Pack Station location and tie into trails within the Mammoth Basin area. Since traffic volumes are relatively high, it was suggested that rumble strip treatments be investigated for partial coverage across the travel lanes as an advance warning treatment for automobiles.
4. Paved aprons should be added at the equestrian crossing areas to limit edge raveling at the trails.
5. Minor rock blasting will be required, such as near the Pack Station, where large boulders lie adjacent to the roadway but obstruct the roadside area.
6. All drop inlets should have bicycle safe grates.

Approved for Distribution

_____ _____

Rick West, P. E. Date
Project Manager

DISTRIBUTION

U.S. Forest Service (USFS)
Bill Fodge, Forest Highway Program Coordinator, USDA Forest Service, Pacific Southwest Region 5, 1323 Club Drive, Vallejo, CA 94592
Alan Tobey, Forest Engineer, Inyo National Forest, 351 Pacu Lane, Suite 200, Bishop, CA 93514
Melissa Totheroh, Civil Engineer, Inyo National Forest, 351 Pacu Lane, Suite 200, Bishop, CA 93514

Town of Mammoth Lakes
Steve Black, Director of Public Works, Town of Mammoth Lakes, P.O. Box 1609, Mammoth Lakes, CA 93546
Peter Bernasconi, Associate Civil Engineer, Town of Mammoth Lakes, P.O. Box 1609, Mammoth Lakes, CA 93546
Mr. Allan Jackson, Town of Mammoth Lakes, P.O. Box 1609, Mammoth Lakes, CA 93546

Federal Highway Administration, Central Federal Lands Highway Division (CFLHD)
Rick L. West, Project Manager, CFLHD
Heidi Hirsbrunner, Highway Design Manager
Alan Blair, Survey Manager
Rich Coco, Right-of-Way Team Leader
Mike Voth, Pavements Project Manager
Matt DeMarco, Geotechnical Engineer
Chris Longley, Highway Design Engineer, CFLHD
Jennifer Corwin, Environmental Specialist, CFLHD
Central files – CA PFH 81-1(1), Lake Mary Road

Carter & Burgess
Jeff Wilson, Project Manager, 707 17th Street, Suite 2300, Denver, CO 80202
Jeanette Lostracco, Environmental Manager (copy)

Butters, Michael E.

From: Lostracco, Jeanette A.
Sent: Wednesday, March 10, 2004 8:43 AM
To: Eden, Dennis L.
Cc: Butters, Michael E.
Subject: FW: modified drop inlets (dry wells) for Lake Mary Road Project

Dennis and Mike,

See below FYI. This shouldn't require any action on our part yet, just be aware of the ideas being looked at by our client.

Jeanette

-----Original Message-----
From: West, Rick [mailto:Rick.West@fhwa.dot.gov]
Sent: Wednesday, March 10, 2004 7:26 AM
To: Corwin, Jennifer; Lostracco, Jeanette A.; Longley, Christopher
Cc: Bustamante, Bernardo
Subject: RE: modified drop inlets (dry wells) for Lake Mary Road Project

I see no problem using these drop inlets if we have a drainage that will require a drop inlet. We need to make sure and verify that the town or USFS has, or can get the pumping equipment to clean this out. Maybe more importantly, will they monitor these and do the maintenance required. Thanks Jennifer. Rick

-----Original Message-----
From: Corwin, Jennifer
Sent: Wednesday, March 10, 2004 6:39 AM
To: Jeanette Lostracco (E-mail); Longley, Christopher
Cc: West, Rick; Bustamante, Bernardo
Subject: FW: modified drop inlets (dry wells) for Lake Mary Road Project

Attached are specs for a drainage structure that the Lahontan Regional Water Quality Board suggest that we consider using if conditions are appropriate and if it doesn't require significant disturbance beyond the existing road prism. Take a look and let me know what you think. The fact that it appears that the primary purpose of these dry wells is to permit settling of traction sand and cinders combined with the fact that this road is not maintainined in the winter makes me think that use of this structure might be overkill. However, I'm not an engineer so I would like you guys to check this out and maybe we can discuss it with the water quality board during the field review tenatively scheduled in June.

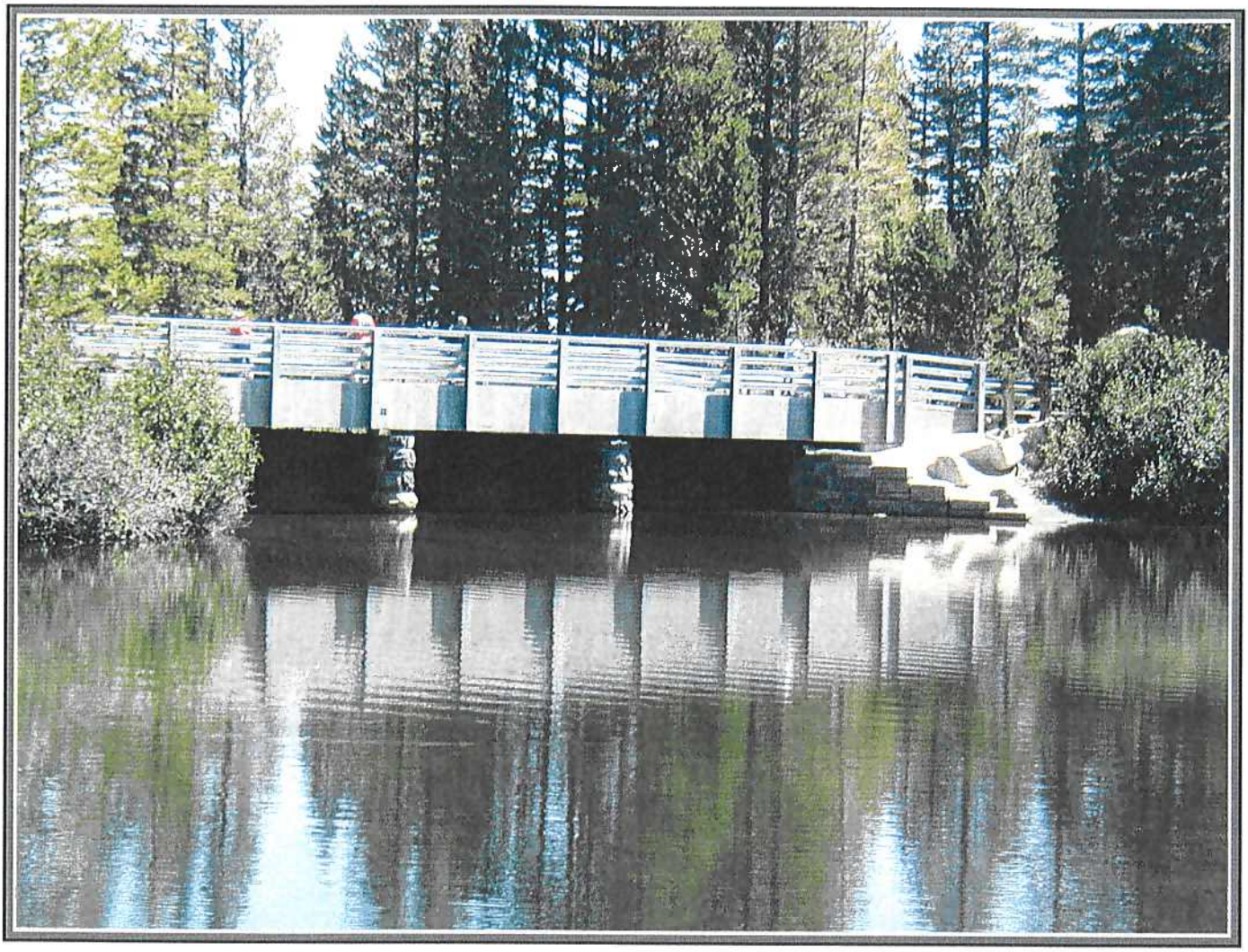
One note, cleaning these dry wells requires the use of vactor machinery. We are told that the City of Mammoth or the USFS has these machines. If we are considering using these dry wells we would need to verify that the City or Forest has these machines with sufficient suction.

-----Original Message-----
From: Dan_Holland@dot.ca.gov [mailto:Dan_Holland@dot.ca.gov]
Sent: Tuesday, March 09, 2004 8:34 AM
To: Corwin, Jennifer
Subject: modified drop inlets (dry wells)

Doug Feay asked me to beam you a copy of our standard overdeep drop inlet. This design has been successful at settling out traction sand and cinders in Mono County, and in particular, Mammoth. The design is a standard G-1 or G-3 drop inlet from our standard design book with an added depth of 0.55 m below the flow line of the outlet pipe.
A few more thoughts:

1) If the total depth of the DI (top edge to bottom of base) exceeds 5 feet, the specs require the use of rebar in the concrete. To avoid this, total depth should be kept under 5 feet where possible.
2) If total depth exceeds 8 feet, the vactor machinery (used to vacuum out sediment) may not be able to reach to the bottom of the DI. Further, some vactor units do not have enough suction to vertical lift sediment/debris at that depth. Need to check with maintenance personnel on that first.
3) The DI can be further modified to contain trash and floating debris by the installation of a "snout" at the outlet pipe.
4) The placement of this type of unit should be done with consideration to the breeding of vector insects. As a rule, there are no mosquito species in the area of Mammoth that are capable of breeding in cold water conditions and carrying encephilitis. The promenant high altitude species is Culisita Inornata, which are adapted to cold weather breeding but do not spread disease. Anopholes Freeborni, the species capable of spreading disease, cannot tolerate the cold water conditions found at this altitude.
5) These type of DI's can also be placed where there is a reasonable expectation that there could be liquid hazmat spill (near a gas station or truck stop), especially if the outflow goes into a waterway or across native soil. They work well as containment vessels.
If you need more info, you can email me or call (760) 872-3021.
(See attached file: modified drainage inlet970.tif)

LAKE MARY ROAD



Culvert Inventory

PHOTO LOG

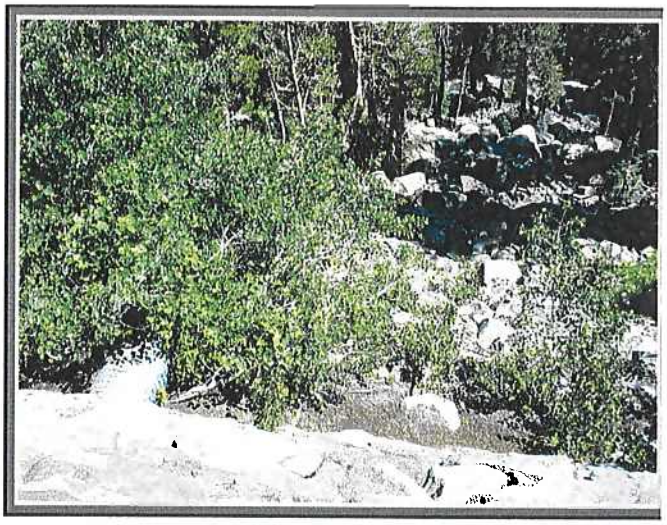
Prepared by:

Carter Burgess

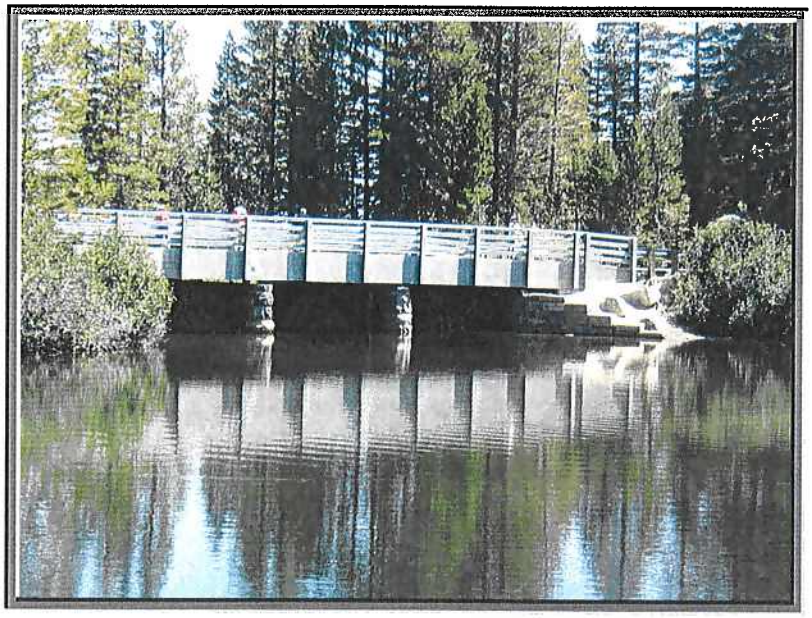
August 20, 2003
Revised June 2, 2004

570+00
24 inch CMP x 60 feet with Headwall
Not found—believed removed

#1
590+89
24 inch CMP x 88 feet with Headwall (MP 0.3)
Condition—fair: recommend to remain; clean inlet.

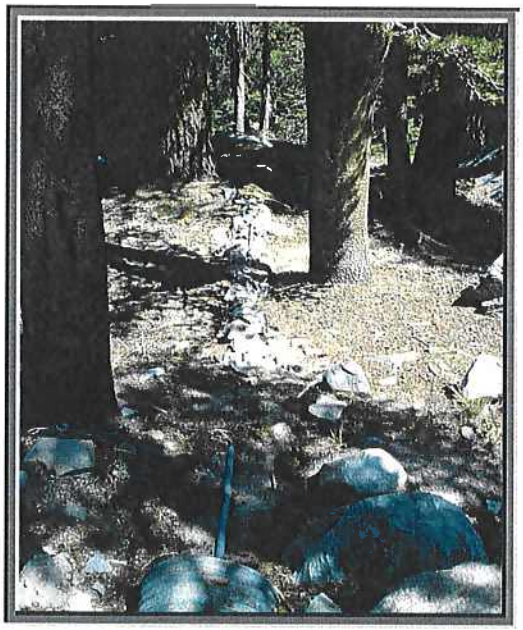


599+30
Lake Mamie Bridge/Spillway (MP 0.6)
Recently reconstructed.

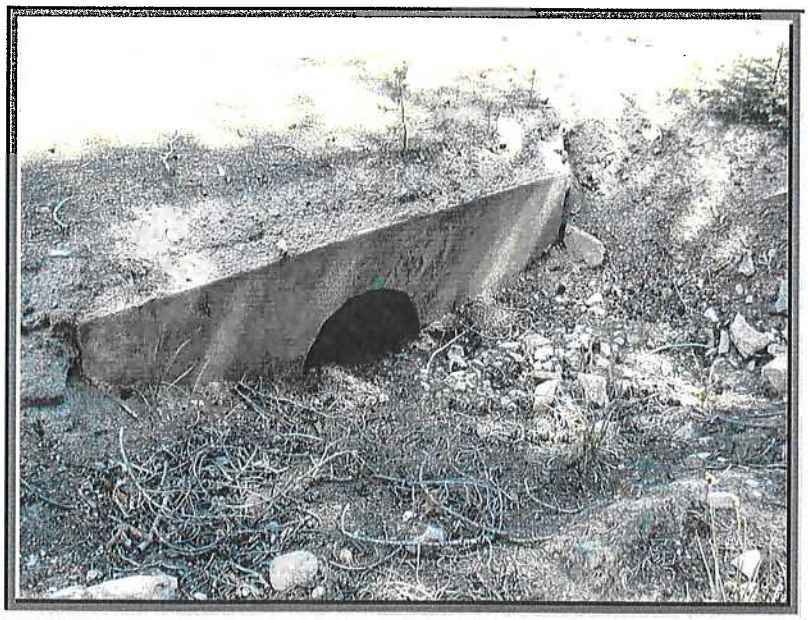


#2
603+50
12 inch CMP
Inlet not found, outlet mostly submerged.
Active water flow from Lake Mamie.

#3
604+88
24 inch CMP x 62 feet with 1 Headwall (MP 0.7)
Condition—good: recommend to remain, clean.
(Note 2-inch water service in pipe)



#4
609+25
24 inch CMP x 40 feet with 1 Headwall (MP 0.7)
Condition—fair: recommend to replace, clean inlet and outlet areas.

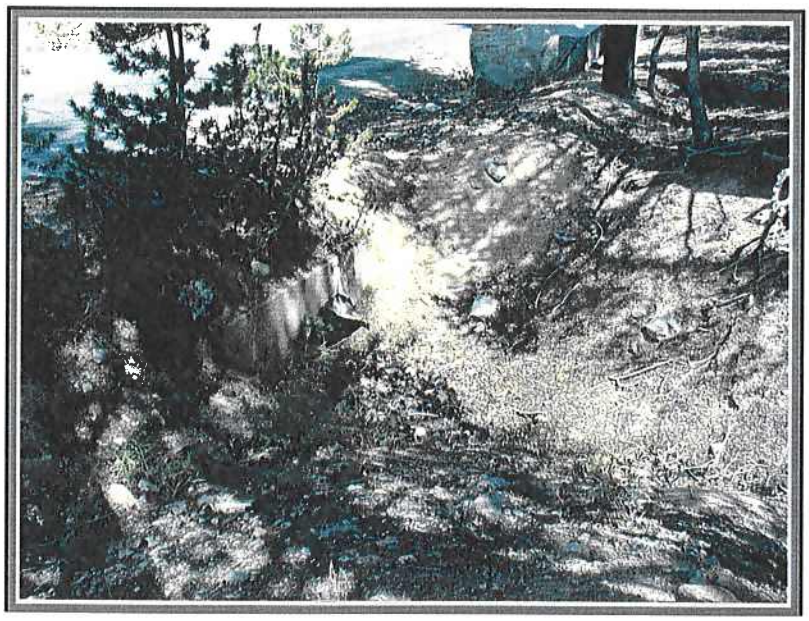


#5
619+41
24 inch CMP x 44 feet with 1 Headwall (MP 0.9)
Condition—good: recommend clean and extend (flows to Lake Mary).

#6
630+08
24 inch CMP x 54 feet with concrete Headwalls (MP 1.1)
Condition—unknown.
Active flow from Lake Mary.

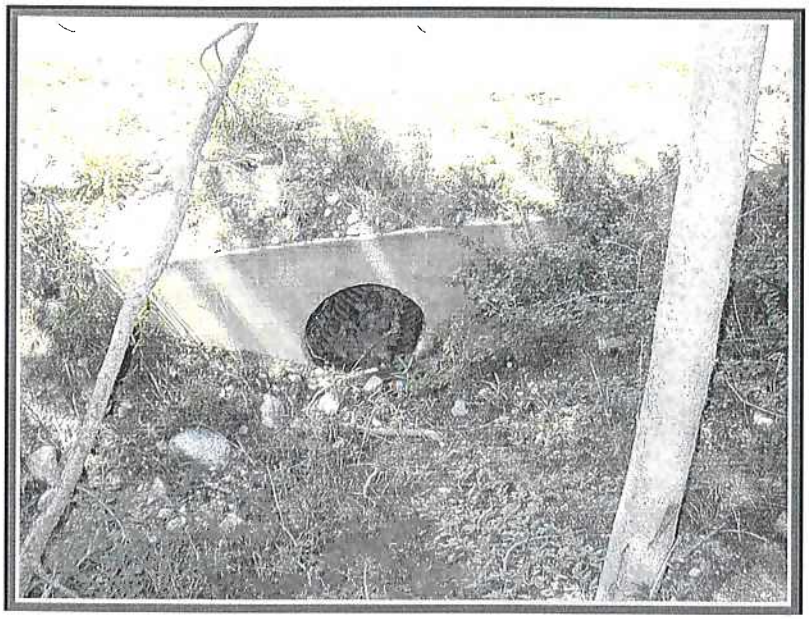
#7
634+54
24 inch CMP x 48 feet with 1 Headwall (MP 1.2)
Condition—fair: recommend replace and clean inlet and outlet areas.

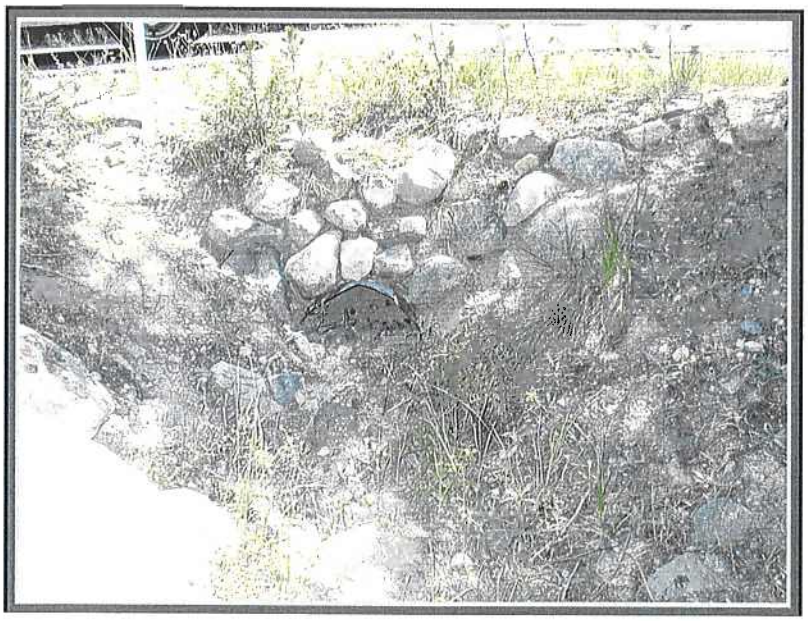
#8
636+25
24 inch CMP x 42 feet with 1 Headwall (MP 1.2)
Condition—fair: recommend replace and clean inlet and outlet areas.



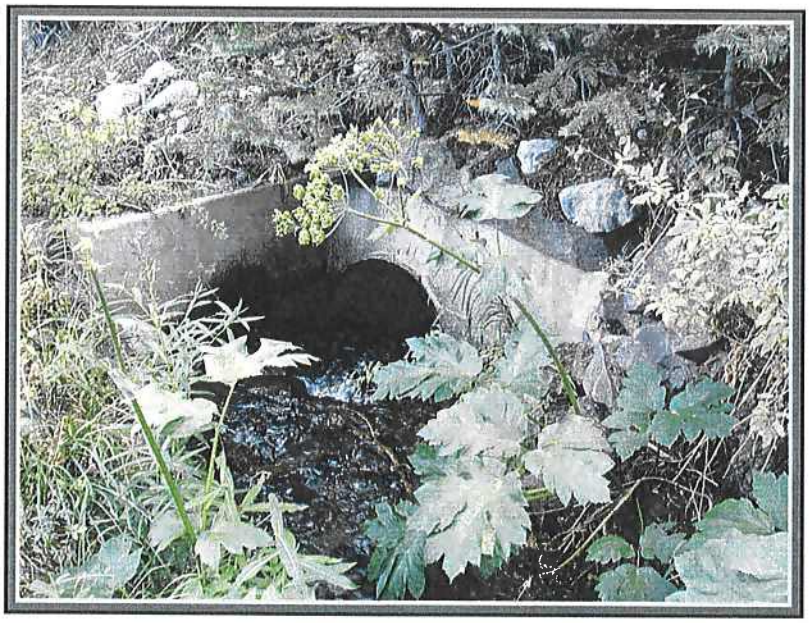
#9
649+90
24 inch CMP x 52 feet with concrete Headwalls (MP 1.5)
Condition—good: recommend to remain, clean/clear inlet and outlet areas.

#10
660+25
24 inch CMP x 52 feet with 1 Headwall (MP 1.7)
Condition—fair: recommend replace or cut and extend with clean inlet and outlet areas.





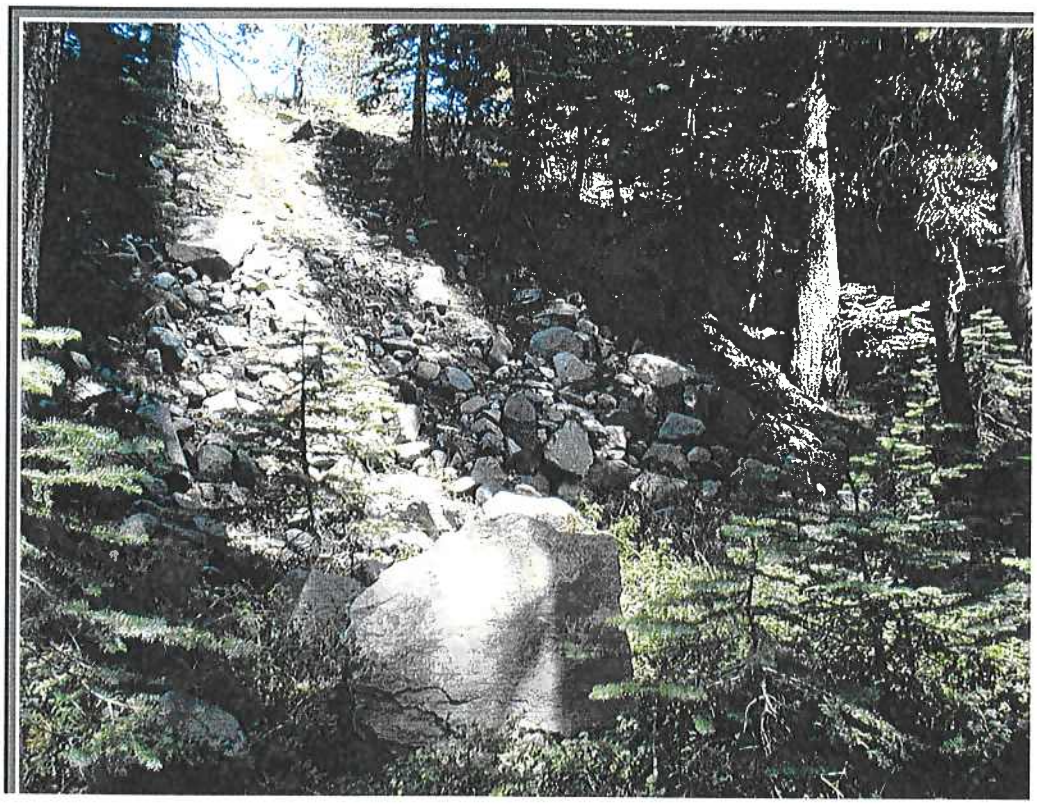
#11
668+93
24 inch CMP x 54 feet with 1 Headwall and 1 wingwall (MP 1.9)
Condition—unknown: recommend to remain due to deep fill.
Active flow toward Old Mammoth City.
Clean inlet and outlet areas.



#12
673+00
24 inch CMP x 56 feet with drop inlet (MP 2.0)
Condition—fair: recommend replace and cut and extend.
Replace drop inlet with bike safe grate.
Clear outlet area.

#13
676+31
24 inch CMP x 52 feet with 1 Headwall (MP 2.0)
Condition—good: recommend to remain.
Clean outlet area and remove large stump.

#14
680+24
24 inch CMP x 46 feet with 1 Headwall (MP 2.1)
Condition—fair: recommend to remain due to deep fill.
Clean outlet area to expose pipe and extend.



#16
Station 692+00 (skewed)
24 inch CMP with drop inlet (MP 2.3)
Condition—fair: recommend to remain.
Replace inlet with bike safe inlet.
Provide outlet protection.
Located approximately 250 feet (outlet) to 285 feet (inlet)
back station of Panorama Dome trail access (right).

#17
Station 696+44 (straight)
24 inch CMP with Headwall and 1 wingwall (MP 2.4)
Condition—fair: recommend to remain.
Provide outlet protection.
Located approximately 175 feet ahead station of Panorama Dome trail access (right).

Lake Mary Road
Existing Culvert Summary

Number (Photo Log)	Station	Size/Type	Approximate Length (ft)	Condition	Recommended Action	Remarks
1	590+89	24" CMP	88	Fair	To Remain - clean inlet	Outlet from Horseshoe Lake
2	603+50	12" CMP	115	Unknown	To Remain - clean	Not found (submerged), active flow from Lake Mamie. Keep 12" pipe so historic flow is maintained.
3	604+88	24" CMP	62	Good	To Remain - clean inlet and outlet	2" water service in pipe
4	609+25	24" CMP	40	Fair	Replace, clean inlet and outlet areas	
5	619+41	24" CMP	44	Good	To Remain - extend downstream and clean outlet	
6	630+08	24" CMP	54	Unknown	To Remain - clean	Not found (submerged), active flow from Lake Mary
7	634+54	24" CMP	48	Fair	Replace, clean inlet and outlet areas	Existing riparian area at inlet and outlet areas
8	636+25	24" CMP	42	Fair	Replace, clean inlet and outlet areas	
9	649+90	24" CMP	52	Good	To Remain - clean inlet and outlet	
10	660+25	24" CMP	48	Fair	Replace, clean inlet and outlet areas	
11	668+93	36" CMP	110	Fair	To Remain - clean inlet and outlet	Bodie Ditch. Active flow toward Old Mammoth City
12	673+00	24" CMP	52	Fair	Replace culvert and drop inlet, clean outlet area	New drop inlet with bicycle safe grate required
13	676+31	24" CMP	54	Good	To Remain - clean outlet, remove large stump	
14	680+24	24" CMP	78	Fair	To Remain - extend downstream and clean outlet	Outlet buried
15	684+84	24" CMP	56	Unknown	Culvert to Remain - replace drop inlet	New drop inlet with bicycle safe grate required
16	692+00	24" CMP	52	Fair	Culvert to Remain - replace drop inlet and add outlet protection	New drop inlet with bicycle safe grate required
17	696+44	24" CMP	46	Fair	To Remain - add outlet protection	Headwall close to roadway
18	700+96	24" CMP	52	Unknown	To Remain - clean	Not found. Contours indicate culvert

Federal Lands Highway Division
PS&E Review Comment Sheet

Subject: Project Name: Lake Mary Road _X_ 15%/30% Review ___ 50%/70%PIH Review ___ Final Review
Project Number: ___CA PFH 81-1(1)_____

From: Roger Kilgore

___ Geotech/Material/Pavement
_X_ Hydraulics
___ Safety
___ Bridge
___ Survey/ROW/Mapping
___ Environment
___ Design
___ P&A
___ Construction
___ Other

RTK (Initials) 4/5/04 (Date Reviewed)

To: Mike Butters, Carter & Burgess

Response/Disposition of Comments:
___ Lead Designer
___ Project Manager

_____ (Initials) _____ (Date Reviewed)

Regular Font = Comment of Minor Significance **Bold Font = Comment of Major Significance**

#	Sht/Pg No.	Comments	Response/ Disposition
1	*	Provide list of referenced material with copies of relevant portions of referenced material, e.g.: What is the source of the soil classification information? Provide a copy of this material. What is the Master Plan referred to? Provide a copy Drainage manual Floodplain maps	Applicable materials from the Town of Mammoth Lakes Storm Drainage Master Plan are now included in the Appendix, including soils classification information. FEMA floodplain map is also now included.
2		Why are bicycle-safe grates called for? These are less hydraulically efficient and more prone to clogging.	Inspection Report by Rick West, dated August 19, 2003 (copy in Appendix) states that all drop inlets should have bicycle safe grates (see Page 13). This will be further discussed during the 30% field review. This statement is a design issue, and has been removed from the Reconnaissance Report. It will be discussed in the Draft Hydraulics Report.
3		We have had problems with the TR-55 method in areas with snow. In such cases, regression equations have been used. Need evaluation of regression equations for this project.	Regression analysis will be done, using the USGS National Flood Frequency (NFF) program. TR-55 analysis will also be done for comparison.
4		Neither TR-55 nor regression equations handle significant storage? How will this be addressed?	Peak discharges are calculated only for those culverts that are recommended for replacement. None of these culvert locations are influenced by storage.
5		Which NOAA source is being considered for precipitation, NOAA Atlas 14?	The project area (Lat 37.7 N, Lon 119.0 W) is just outside of the NOAA Atlas 14 Domain. NOAA Atlas 2 data is being used.

Federal Lands Highway Division
PS&E Review Comment Sheet

#	Sht/Pg No.	Comments	Response/ Disposition
6		Does the Inyo National Forest have a Forest Plan? Many other forests, especially in California do. In many of these cases, the Forest Plan addresses culvert sizing. This should be included in the report.	The Inyo National Forest Land and Resource Management Plan has been reviewed. The Plan does not address culvert sizing, but does offer some guidelines on erosion control, water quality BMP's, and general roadway and drainage design practices. Excerpts from the Plan have been added to the Appendix. The Plan will be referred to throughout the design process.
7		The Fish Passage issue should be addressed as part of this report. (The Forest Plan, if one exists, may include this issue.)	The Forest Plan requires stream crossings to be designed to accommodate fish passage where proposed roads and trails will cross streams that support active or potential fisheries. Fish passage for culverts in streams is also a requirement of the California Regional Water Quality Control Board, Lahontan Region. The culverts that are proposed for replacement do not appear to require fish passage. This will be further assessed during the 30% field review.
8		I am skeptical of the "dry well" drop inlets. I find that they don't work because they are not maintained. Is there some thought that they would be required?	This alternative had been suggested by the California Regional Water Quality Control Board (Lahontan Region), and some of the e-mail discussions were forwarded to Carter & Burgess (copy in Appendix). This will be further discussed during the 30% field review. This statement is a design issue, and has been removed from the Reconnaissance Report. It will be discussed in the Draft Hydraulics Report.
9		Please integrate the photo log with this report and make sure the location references are consistent.	The photo log is now included in the Appendix and has been revised so location references are consistent with the photos.
10		The only distribution for this report is to CFLHD; reformat in a report style rather than in this trip report style.	Report has been reformatted into a report style. Distribution will be internal within CFLHD.

* All comments are for Draft Reconnaissance Report, dated April 2, 2004.